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Notes and Comments

A Glimpse into the Future

A WORLD based on ammonia was pictured by Dr. Edward Curtis Franklin, professor emeritus of organic chemistry in Leland Stanford University, when accepting the Willard Gibbs Medal of the Chicago Section of the American Chemical Society. Dr. Franklin, who is hailed as the founder of a new school of chemists, the third generation of which is now working on the basis of his "ammonia system of acids, bases and salts," visualises three worlds. First, the water world of Thales of Miletus, who "founded philosophy on the assertion that water is the origin of all things"; second, the ammonia world of the chemist in which "all things are metamorphosed forms of ammonia"; and, third, a speculative after-world in which "hell must be a region where hydrogen sulphide takes the place occupied by water in Thales's world, and where one drives away dull care by imbibing more or less highly concentrated solutions of ethyl mercaptan in liquid hydrogen sulphide." In Dr. Franklin's waterless world there are oceans of dilute liquid ammonia with sodium chloride in solution. Liquid ammonia vapour in an atmosphere of nitrogen is transported over the land and precipitated from ammonia clouds as ammonia rain in the tropics, and as ammonia snow in the arctic regions. Assuming that water and its compounds have been obliterated for the time being and ammonia and its compounds take their place, liquid ammonia becomes conspicuous for its capacity as a solvent for salts; the pure liquid is practically a non-conductor of electricity, and salt solutions are excellent conductors. A great many salts also form compounds with ammonia which the ammonia chemist calls ammonated salts or salts with ammonia of crystallisation.

Ammonia Cocktails

THE ammonia chemist's discoveries also bring to light the existence of ammonia bases which may be neutralised by ammonia acids to form neutral ammonia salts. Organic chemists, by replacing the hydrogen of organic hydrocarbons with ammonia residues, prepare compounds known as alcohols and ethers, which in turn are converted to aldehydes and carbozylic acids, whilst the ammonia biochemist investigates ammono-sugars, starches and fats. The ammonia physiologist also tells us that in the ammonia world all animals derive their nourishment from plants. The ammonia plants synthesise sugars, which he calls carboammonates, ammono celluloses, fats, proteins and vitamins from his carbonic acids, just as the water plants build up the analogous water compounds from aquo carbonic acid and water. Ammonia animals ingest liquid ammonia, carboammonates, ammono fats, starches, and proteins, breathe in nitrogen and excrete ammonia and some one or the other of his eleven ammono carbonic acids, while those infractors of the prohibition law who insist on cocktails drink liquid ammonia solutions of either ethylamine or diethylamine.

Dr. Franklin, whose studies in ammonia chemistry began thirty-five years ago at the University of Kansas, summed up his ideas with the statement that "an ammonia system of acids, bases and salts may be formulated on the basis of ammonia as the typical substance, and in a manner entirely analogous to the formulation of the ordinary oxygen acids, bases and salts as derivatives of water. In other words, a system of acids, bases and salts has been developed in which nitrogen occupies a position similar to that occupied by oxygen in the system of Lavoisier."

Professor Briscoe's Appointment

HIS many friends in the chemical industry will be interested to learn that Professor H. V. A. Briscoe, for eleven years Professor of Inorganic and Physical Chemistry at Armstrong College, Newcastle, and for six years Director of the Department of Chemistry, has been appointed to the Chair of Inorganic Chemistry at the Imperial College of Science and Technology, South Kensington. During his eleven years at Newcastle, he has carried on research in pure chemistry and his department has produced more than a hundred papers on a great variety of topics in inorganic chemistry. As hon. secretary and director of research to the Northern Coke Research Committee, he has accomplished a great deal to the advancement of the coking industry. Professor Briscoe is a member of the Northumberland and Durham Coal Survey Committee of the Department of Scientific and Industrial Research (Fuel Division) and a member of the Tyneside Industrial Conference. He has thus maintained a close link between the educational and industrial interests of chemical science and as chairman of the local sections of the Institute of Chemistry and the Society of Chemical Industry he has further stimulated works chemists in their factory and laboratory problems.

At Armstrong College he has served as secretary of the committee responsible for the design and erection of the new college library. During Dr. Greig's absence in America he acted as registrar of the college, and was directly responsible for all details of design and

arrangement generally in connection with the new hall of residence for men which is approaching completion at Cochrane Park. In the preparation of the pension scheme now in operation for the working staff at the college he also actively co-operated. His service for six years as secretary of the Durham School Examinations Board gave him close contact with the schools and education authorities. He is president of the Northern branch of the Science Masters' Association, an elected governor of the Royal Grammar School and the Church High School, Newcastle, and was one of the two British members of the International Committee on Atomic Weights. He served for three years on the council of the Chemical Society, and for two years on the councils of the Institute of Chemistry and the Society of Chemical Industry. Throughout the war Professor Briscoe was engaged in the manufacture of chemicals for munitions and medical purposes. This was followed by a varied experience of chemical technology and of the design and operation of many types of chemical plant. The first factory in this country for the manufacture of thorium nitrate (one of the principal ingredients of the incandescent gas mantle) was designed, erected and worked by Professor Briscoe. He was, later, a consulting chemical engineer to several important companies, with special reference to fuel problems.

Chemical and Metallurgical Corporation

FOR the second time in its not very long life the Chemical and Metallurgical Corporation is seeking to shake off its losses. The profit and loss account shows a gross trading profit of £23,136, compared with £14,038 (years to December 31), the actual net profit, before depreciation, on the same basis as last year being £7,269, compared with £8,003. There is, however, a non-recurring profit of £1,562 on the sale of scrap plant, which brings the total net profit up to £8,831 before depreciation. The balance-sheet shows that £14,508 had been spent on additional properties and plant during the year, but that the money for that and other expenditures has come from an increase in the bank overdraft from £53,068 to £81,619. The reorganisation proposals which are put forward with the report include writing 10s. off every £1 preference share, making the cumulative dividend of 8 per cent. a non-cumulative dividend at the same rate, but adding a participating right for a further 8 per cent.

Under the present articles the directors are entitled to $7\frac{1}{2}$ per cent. of the net profits after a 25 per cent. dividend has been paid on ordinary shares, but in new articles which are to be submitted for approval, the 25 per cent. dividend is reduced to 5 per cent.

Public Economy and Private Spending

THE citizens of London, while recognising the economies already effected in national expenditure, are convinced that, before the nation can hope for a return to prosperity, economies on a far greater scale both in national and local government expenditure must be undertaken and carried out in the immediate future. It is beyond question that to a great extent the nation is living on its capital, and that the crushing burden of taxation, national and local, is having disastrous reactions upon the trade and commerce of the country, and is throwing thousands of workpeople out of employment, and must, if continued, grievously lower the standard of living of the entire population. Such were the sentiments expressed in a resolution passed at the second City of London public economy demonstration at the Cannon Street Hotel on May 26, which unanimously called upon the Government to inaugurate at once such further measures as will effect a great reduction in national expenditure and consequent taxation, and upon local authorities so to frame their policy in the immediate future as will enable them to reduce their claims for assistance upon the national exchequer and to reduce their own rates.

The demonstration, presided over by Mr. E. C. Grenfell, the City's Member of Parliament, was addressed by Sir Robert Horne, Sir Eric Geddes and Sir Ernest Benn, all of whom showed that drastic measures were necessary to stop the wanton extravagance of to-day. Sir Ernest Benn rightly drew a distinction between public economy and private parsimony. If we could achieve drastic public economy and liberal private expenditure, he said, we should soon again be back on the road to prosperity. Unless it was made clear that we as a nation were determined to pull down the heavy burden of public expenditure all hope of prosperity was gone.

Conditions in the West Indies

IT is interesting to note from the report on conditions in the British West Indies, from which we gave extracts last week, that generally speaking the total value of the imports into the individual colonies during 1930 was less than during the previous year, but this is attributed more to reduced values than to lesser quantities. The imports from the United Kingdom were well maintained, and in some of the colonies the percentage of total imports showed an increase in points of value. There is every indication that the suspension in the United Kingdom of the gold standard has given a fillip to the demand for United Kingdom productions. On the other hand, the high premium on United States currency has weakened American competition. United Kingdom manufacturers and export merchants are strongly advised to exercise extreme caution in dealing with firms of whom they have no knowledge. Careful inquiries should be instituted before shipments are made; otherwise, severe losses may be incurred.

According to the British Trade Commissioner, the biggest problem in the West Indies at the present time is that of sugar. The prevailing deplorable condition of the sugar industry has necessitated the introduction of the Chadbourne Five-Year Plan, with the object of inducing the Continental beet sugar producers and the Java cane sugar producers to unite with producers in Cuba with a view to removing the pressure of surplus stocks from the market and to ending over-production. The initial working of the plan has proved it to have been based on a solid foundation, for although it has not increased the value of sugar to any appreciable extent it has arrested the decline in prices and its success has exceeded expectations. The scheme has brought about drastic reductions in crops. Cuba has made 1,500,000 tons less than during 1930, the Continental beet crop now being made is estimated at 2,500,000 tons less, and Java is to adjust her production to requirements. As a result, world production has been brought well below consumption.

Safety Electrical Appliances in Chemical-Using Factories

By J. H. WEST, M.I.Chem.E.

The risk of explosion and fire from electric power and light circuits in buildings where inflammable liquids and vapours are used is a very real one, though modern appliances are now available which reduce the risk to negligible proportions. The existence and use of these appliances is, however, not so widely known as it should be, and the object of this article is to describe the precautions which should be taken to minimise risks.

UNDER normal working conditions inflammable liquids are confined to the apparatus in which they are made or used, but accidents are liable to occur which lead to leakages, the spilling of liquid, or escape of vapour, and as all these liquids are volatile, an explosive mixture of vapour and air will result. Should this mixture come in contact with an electric spark, a violent explosion will then ensue. The conditions in a building where such an explosive mixture has been formed are much the same as in a coal mine where fire damp is present, and to-day the Factories Branch of the Home Office is to a considerable extent guided by mining practice in dealing with such matters.

"Flame-Proof" Apparatus

The obvious method of preventing a spark in any electrical appliance from igniting inflammable liquid or vapour in its vicinity is to make the appliance, whether motor, switch, or light fitting, totally enclosed and gas-tight. This, however, is less easy than it sounds. The shaft of a motor must come outside the enclosure, and with changes of temperature the motor "breathes," *i.e.*, it expels air when heating up and draws in some of the surrounding air when it cools down again. The same may apply to a switch where the operating handle projects from the interior. Instead, therefore, of seeking to prevent the explosive mixture from gaining access to the interior of the appliance, means are taken to prevent the transmission to the outside atmosphere of any explosion which may occur within the appliance. It is simply the old principle of the miners' safety lamp put to a new use. Such an arrangement is called a "flame-proof enclosure," and the conditions which have to be complied with are laid down in British Standard Specification No. 229 of 1929. Tests are carried out on such appliances by filling the internal space with an explosive mixture of vapour (or gas) and air, and firing this while the whole appliance is surrounded on the outside by a similar explosive mixture. Until recently these tests were carried out at Sheffield University on behalf of the Mines Department, but the latter now have their own testing station near Buxton. In the case of appliances which successfully pass this test a certificate is issued by the Mines Department, and this certificate is accepted by the Home Office.

Situation of Electric Motors

Where possible motors should be placed outside the danger area, where the inflammable liquid, vapour, or gas is present or is liable to be present in the atmosphere due to some accident. Where a motor is driving line shafting it is usually possible to place it in an annex outside the building or in a part of the building separated by solid walls from the danger area, running the shafting through the wall, where means are taken (such as a bearing or stuffing box in the dividing wall) to prevent vapour from passing into the motor compartment. Access to the motor compartment should be by a door leading into the open air. The great advantage of this arrangement is that ordinary industrial motors and switchgear can safely be used in the separate motor house or compartment, and these are naturally much cheaper than the special flame-proof gear. There is, however, one qualifying condition for complete safety under all conditions. It may happen that a considerable volume of inflammable liquid may get loose and produce a large volume of vapour mixed with air.

It is to be noted that, while most of these liquids are lighter than water, their vapours are heavier than air and tend to sink down to the ground. Hence a wave of explosive mixture may flow out from the danger area and find its way to the motor house. In most cases, however, this will take an appreciable time, and meanwhile all electric power should have been shut off; this is the first step that should be taken in the event of any accident resulting in the liberation of inflammable material, after all men have been moved from the danger area.

To facilitate the quick cutting off of the electric supply, push switches should be arranged in prominent positions outside the danger area, and arranged to short-circuit the no-volt coil on the main circuit-breaker of the building involved.

An Emergency Switch

Another necessary safety precaution when the motor or motors are in a separate building or compartment, is the provision at suitable points inside the danger area of flame-proof push switches connected across the no-volt coil of the motor starter, so that the motor can be instantly stopped in the event of anyone becoming caught in the shafting, or some of the machinery seizing up, or breaking suddenly. A flame-proof switch suitable for this purpose is made by George Ellison, Ltd., of Perry Barr, Birmingham, and is shown in Fig. 1,

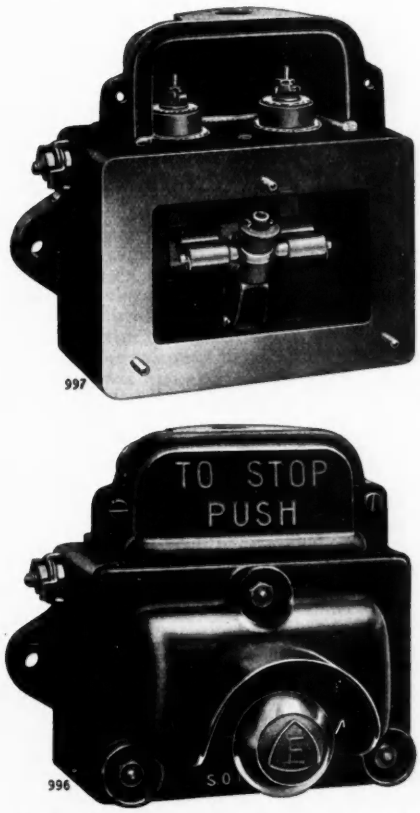


Fig. 1. Flame-proof emergency and signal switch (George Ellison, Ltd., Birmingham.)

one of the two views showing the covers removed. This simple switch well illustrates the general principle of flame-proof construction. It will be noticed that the main cover is attached by a broad flanged joint to the body; these flanges are left rough-machined, and are bolted up metal to metal without any jointing material, thus purposely making the joint non-gas-tight.

In the event of explosive vapour finding its way into the switch and being fired by a spark at the switch contacts, a small explosion will occur and the pressure thereby produced will be quickly relieved through the flanged joint, but the flame of the explosion is so much cooled by being spread out in a very thin layer between the heavy iron flanges,

that the temperature of the issuing gas is too low to ignite any vapour on the outside of the switch. The leads to the switch come through a hole in the top of the box covering the terminals. After the leads have been connected up this terminal box is filled up with melted insulating compound and the cover is then screwed on. This is a very important point, for the terminals are not within the flame-proof enclosure, and failure to fill up the terminal box with compound will leave the possibility of sparking if the terminals become loose, and thereby render the switch no more effective than any ordinary one.

In making application for the testing of flame-proof appliance the makers have to state the nature of the inflammable gas or vapour with which it is to be used, and this is important because the maximum safe distance apart of the flanges varies according to the gas or vapour. Hydrogen gives the most difficult flame to extinguish, and for it the flanges must be virtually in contact; for ether vapour, ethylene, and acetylene the clearance should be slightly greater, while for methane, petrol vapour, acetone, and most solvents about one-fiftieth of an inch may be permitted between the flanges. In buying flame-proof appliances it is therefore important to insist on the makers supplying a copy of the Mines Department certificate, which should specifically cover risks from the vapour or gas with which the appliance is to be used. It is also necessary to be sure that the certificate applies to the actual appliance being bought, and not to another of the same series. For instance, a certificate issued for a 5 h.p. motor only holds for that particular size and type of motor, and does not cover a 10 h.p. motor, even if of exactly similar design.

The Choice of Motors

Returning to the question of motors, there are of course, many cases where these must be close to their work, as where they are direct-coupled to centrifugal pumps or rotary compressors, and we then have to face motors in the danger area itself. Apart from flame-proof arrangements the A.C. squirrel cage induction motor is the safest type to use, as no sparking can occur apart from damage to the insulation of the winding resulting in a short-circuit. The slip-ring induction motor is the next best, and the D.C. motor, where sparking at the brushes is certain to occur, is to be avoided.

In above-ground work there is one arrangement available which cannot be used in mines, and that is the pipe-ventilated motor equipped with ventilating ducts which are carried to the outside of the building, so that pure air is drawn in over the windings and discharged again outside. This, applied to a properly designed squirrel cage motor is the best and cheapest solution of the difficulty. The motor casing, however, must be completely enclosed except for the inlet and outlet pipe connections. These should be flanged, and the flanged ends of the ventilating pipes should be bolted on with a proper gas-tight joint of rubber or some other suitable jointing material. The ducting must not be of the usual loose slip-on joint type; slip-on joints are permissible provided they are reasonably long and well-fitting and soldered or welded joints are not necessary, the idea being that the current of air through the ducts will be too quick for much vapour to get in. On the delivery side the pressure will be slightly above atmosphere, and on the suction side slightly below, so that the joints on the latter are more important. The length of the ducts should not be more than 8 to 10 ft.; hence the motors should be arranged near an outside wall. Also the cross-sectional area of the ducts should be ample, as few bends as possible being used, otherwise the resistance of the ducts will prevent a proper circulation of air over the motor, and not only increase the danger of vapour getting into the motor, but will fail to cool the windings properly. The motor should also have an internal fan on the spindle to assist definite circulation.

In the case of slip-ring motors, the slip-rings must be provided with a flame proof enclosure, but the carcase of the motor can be pipe-ventilated in the same way as a squirrel-cage motor. Fig 2 illustrates such a motor by Crompton-Parkinson, Ltd., where it will be noticed that there are broad machined flanges on the slip-ring enclosure, these very slightly open joints serving to allow free "breathing," and relieve pressure if an explosion occurs, whilst preventing the exploded gas from issuing at a temperature high enough to do any harm.

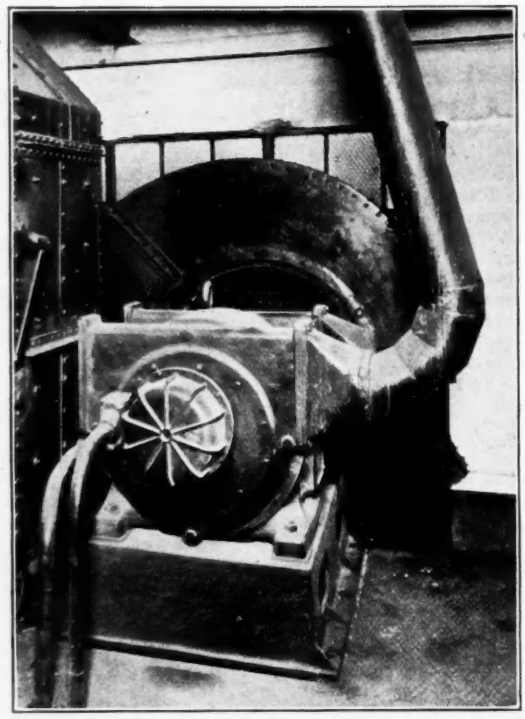


Fig. 2.—Pipe-ventilated slip ring motor (Crompton-Parkinson, Ltd.)

Where a number of small motors have to be used in the danger area, it is a good plan to group them together as far as possible near an outside wall. This saves cost in wiring up, and the motors are more likely to be properly looked after than if they are scattered in dark and inaccessible corners. If for some special reason a motor must be situated in the danger area too far away from outside walls for pipe-ventilation to be effective, recourse must be had to a totally-enclosed motor which has been certified as flame-proof by the Mines Department. Any ordinary totally-enclosed motor will not do. In order to keep down the cost of such motors, which is necessarily high by reason of the low power rating for a given fram size on account of temperature rise owing to absence of internal ventilation, an outer case is often provided, and air is circulated by fan between the two cases. Even so, this type of motor is very expensive compared with the pipe-ventilated type.

(To be continued.)

Chemical Manures in Ireland

Promoting a Better Market

In the educational exhibit staged by the Free State Department of Agriculture for the benefit of farmers at the spring show of the Royal Dublin Society, at Ballsbridge, Dublin, recently, special attention was drawn to the inadequate use made of chemical manures in the Irish Free State as compared with other countries. A section showed samples of various artificial fertilisers with specimen turfs, showing the benefits to be obtained from each type. Examples were also given of the various crops which benefit specifically from the application of chemical manures.

The attention which was especially drawn to these commodities by the Department of Agriculture at the spring show will be continually emphasised by the travelling instructors and inspectors throughout the year and should promote a much better market for chemical manure and fertiliser manufacturers. It is understood that special interest is being taken in phosphates and superphosphates.

The Electro-Chemical and Metallurgical Industries of Norway

By O. W. ROSKILL

This article deals with the subject of hydro-electric power as utilised in Norway, having special reference to the electro-chemical and electro-metallurgical industries of that country.

THE utilisation of hydro-electric power for industrial purposes in Norway had already progressed, particularly in the case of the wood-pulp and paper industries, in the '80s of the last century. Since then there has been a rapid and continuous increase in the installed capacity of power stations which is now estimated to total 1.8 million kW, of which the electro-chemical and electro-metallurgical industries account for about 45 per cent., public utility supply about 30-35 per cent. and miscellaneous industrial requirements the remainder. Of the total installed capacity private power stations account for about 60 per cent., municipal 25 per cent., and State 15 per cent. A large part of the State-owned capacity is represented by two plants—at the Nore Falls (3 units of 35,000 h.p. each, with a fourth of the same size as reserve), and at Glomfjord (3 units of 27,500 h.p. each), and if the extensions planned at these two plants are completed, the proportion of the total capacity owned by the State will be increased.

Efforts are now being made to improve the load factor and increase consumption by organising distribution on a large scale and concentrating production in large and efficient power stations along lines not very different from those adopted in the case of the British grid. In view of the inefficiency previously resulting from lack of co-ordination between districts, this movement should undoubtedly produce beneficial results, although how far concentration of production can prove economic in rural areas where consumption is relatively small and sparsely distributed, transmission costs high, and small local falls often available, is open to question.

Cost of Hydro-Electric Power

The capital construction costs for hydro-lectric power plants in Norway vary as widely as in any other country according to size of plant, location, date of construction, length of time taken in completion of the work, etc., but in general terms it is estimated that the capital expenditure on plants for the pulp and paper industry has averaged Kr. 250 per h.p. (=£13.8 at par*), while the power plants for electro-chemical and metallurgical works erected in the period immediately preceding the war probably averaged only Kr. 100 to 150 per h.p. (=£5.5 to £8.3) and must be among the cheapest in the world. At the present time capital costs average about Kr. 400 per h.p. (£22.1). Naturally, apart altogether from effects due to fluctuations in prices of materials, capital costs tend to rise continually as the more favourably situated falls are developed. Nevertheless the developed h.p. in Norway is still a relatively small proportion of the total available. Estimates for the latter always differ rather widely, but an indication can be obtained from the official statistics which give the figure of 12 million turbine h.p. constantly available to which additions must be made for small falls and for power utilisable but not available all the year round, giving a maximum of over 16 million turbine h.p. The U.S. Geological Survey, which bases its figures on 90 per cent. of the constant flow available, gives 9.5 million h.p. to which, again, the various additions must be made to give the maximum figure.

Due rather to the large proportion of the total power output utilised by industries such as nitrogen and aluminium which have a high load factor, rather than to efficient co-ordination of distribution, Norway stands first of all countries classified in order of the average operating period, with a figure of about 5,100 hours per annum. This figure, which is based on conditions in 1929, will be lower at the present time owing to the fact that these industries are unable to operate at capacity, particularly since a large proportion of the output of electro-chemical and electro-metallurgical products is exported. On the other hand, it is expected to counteract this by improved distribution, as mentioned above. The figure for the United Kingdom, it should be added, was about 1,700 hours per annum in the same year.

The Norwegian aluminium industry, which depends upon exports for the disposal of the greater part of the output, has so far survived the depression with considerable success. This is best seen by comparing Norwegian with Canadian exports:—

	Norway (metric tons).	Canada (short tons)
1929	29,813	36,485
1930	23,676	21,664
1931	24,351	10,770

This has been largely due to the increasing shipments made to Russia which took over 50 per cent. of the total Norwegian exports in 1931 (26.5 per cent. in 1930); and the Norwegian producers will undoubtedly be very badly hit if the new Dnieprostroi aluminium plant reduces imports in accordance with the provisions of the Five Year Plan.

Norwegian Aluminium Works

The Norwegian aluminium works are all controlled from abroad. Aluminium, Ltd., controls the A/S Norsk Aluminium, which operates a plant at Hoyang on the Sognefjord with a capacity of 7,000 tons per year, and has a rolling mill, the A/S Nordisk Aluminiumindustri of Holmestrand, attached (although a large part of the output of ingots is exported). Bauxite is obtained from the South of France and electrodes are made on the spot, while the works is of particular interest as including a Pedersen alumina plant which yields the iron oxide content of the bauxite as a special grade of vanadiferous iron, constituting an important by-product. L'Aluminium Français controls Det Norsk Nitrid A/S which, although it was originally formed to produce aluminium nitride by the Serpek process, now owns two aluminium plants which were built during the war by the Cie. d'Alais, Froges et Camargue. The first, at Eydenhaven, near Arendal, has a capacity of about 10,000 tons per year, and the second at Tyssedal, near Odda, a capacity of 6,000 tons per year. The British Aluminium Co. also controls two plants; a small plant at Stangfjord (capacity 800 tons per year), which was the first aluminium plant erected in Norway, but is no longer operated, and the plant at Vigeland near Kristiansand operated by the A/S Vigelands Brug, which has a capacity of 3,500 tons per year, and besides producing raw aluminium in notched bars, H blocks, wire billets, etc., makes aluminium/silicon alloys. Finally there is the A/S Haugvik Smelteverk controlled by the Aluminium Corporation, Ltd. The Alliance Cie. of Basle recently acquired a large interest in the latter concern in order to bring all the Norwegian output under the control of the international group. The Haugvik plant started in October, 1927, and at the end of 1928 doubled its capacity which is now about 8,000 tons per year. The maximum total capacity of the Norwegian plants is thus seen to be about 36,000 metric tons per year, while the output in 1930 was about 25,000 tons or 70 per cent. of capacity.

Electrolytic Zinc and Nickel

As regards other electro-metallurgical plants, Det Norske Zinkkompani A/S of Eitrheim, near Odda, on the Hardanger fjord is the largest electrolytic zinc plant in Europe with a nominal capacity of 36,500 metric tons per year. The 1930 output was 34,611 tons. The plant, which is controlled by the Cie. Royale Asturienne des Mines, started up in 1929, ore being obtained principally from the Reocin mines in Spain. Power is leased from the A/S Tyssefaldene, the company's requirements being about 30,000 h.p. or 4,800 kWh per metric ton of zinc. There have been various semi-experimental plants in Norway for the production of zinc electrothermically, and actually Det Norske Zinkkompani was originally organised for this purpose, but none of these plants are in operation now.

* Kr. 18.159 = £1.

Electrolytic refining of nickel has been carried on intermittently at Kristiansand for a number of years on a small scale, but it is only recently that the large plant of Falconbridge Nickel Mines, Ltd., has been put into operation. Matte is imported from Canada where the Falconbridge properties adjoin those of the International Nickel Co. and the Norwegian plant has an annual capacity of 3,000 tons of nickel and 1,800 tons of copper, provision having been made for expansion of the capacity up to 5,000 tons of nickel per year. Sodium is manufactured by the A/S Vadheim Elektrochemiske Fabriker, which owns a plant on the Dyrnesli River.

The Carbide Industry

The carbide industry in Norway has, like that of other exporting countries, been adversely affected by economic nationalism and over production, and there has been a marked tendency for carbide plants to go over to the manufacture of other products—particularly ferro-alloys. This has been accentuated by the depression in the fertiliser industry which has reduced the output of cyanamide. The largest carbide producer, and the only producer of cyanamide, is the Odda Smelteverk A/S, on the Hardanger fjord which, like the Norske Zinkkompani, obtains power (about 35,000 h.p. at the present time) from the A/S Tyssefaldane. It is associated with the A/S Hafslund. The total carbide capacity (Frank-Caro process) is about 90,000 tons per year, of which about one-third was intended for export as such, and the remainder for conversion into 80,000 tons of 22 per cent. cyanamide. The actual output, however, has never exceeded 60,000 tons of cyanamide, and at present is considerably less. The second largest carbide plant is that of the A/S Hafslund near Sarpsborg (Ostgold Province) which has a capacity of 40,000 tons of carbide and 25,000 tons of 45 per cent. ferro-silicon. This company reported a loss on its carbide operations in 1930. The Notodden Calcium-Carbidfabrik A/S has a capacity of 8,000 tons of carbide and 1,000 tons of electrodes, although the carbide output is only about half the capacity. The maximum Norwegian carbide capacity, including carbide for conversion to cyanamide, is therefore about 150,000 tons per year, or, say, 90,000 tons excluding cyanamide. The output, however, never attained anything like this figure even before the present depression, production in 1929 having been about 60,000 tons. Most of the output is exported, Great Britain being the chief customer.

The A/S Bjolvefossen was originally intended for the manufacture of carbide and cyanamide, but has since taken up the manufacture of ferro-silicon instead. The A/S Meraker Smelteverk of Murviken on the Trondhjemfjord, which is associated with the A/S Hafslund, is also making increasing quantities of ferro-alloys, and decreasing quantities of carbide. The capacity of the power plant of the latter company at the Koppera falls has been continually expanded and now totals about 24,000 h.p. After the A/S Hafslund, the Porsgrunds Elektrometallurgiske A/S is the second largest producer of ferro-silicon with a capacity of about 12,000 tons per year. A smaller works for the manufacture of ferro-alloys (chiefly ferro-silicon and ferro-chromium) is that of the A/S Fiskaa Verk near Kristiansand, which is controlled by Det Norske A/S for Elektrokemisk Industri and also makes Soderberg continuous electrodes. There are several other small ferro-alloy plants, the total output of all types of ferro-alloys in 1930 having been 123,000 metric tons (133,000 metric tons in 1929). In spite of the number of carbide plants which have gone over to the manufacture of ferro-alloys the output and exports of the latter have decreased ever since 1929. Exports of ferro-alloys are shown in the following table:—

	1929 (metric tons)	1930 (metric tons)	1931 (metric tons)
Ferro-manganese	68,980	47,092	32,030
Ferro-silicon	40,896	27,262	27,061
Ferro-chromoum	3,869	4,076	4,856

Fixation of Atmospheric Nitrogen

The nitrogen plants of the Norsk Hydro-Elektrisk Kvaelstof A/S, are situated at Rjukan and Notodden in Telemark. These originally operated according to the Birkeland-Eyde arc process and attained an output of about 35,000 tons of nitrogen per year, chiefly in the form of Norway nitrate, sodium nitrate and ammonium nitrate. Intense competition in the nitrogen market combined with the large power consumption per unit of fixed nitrogen produced, reduced the company's profits until in 1926/27 a small loss was made. It was decided, therefore, to change over from the arc to the synthetic ammonia process, obtaining the necessary hydrogen by electrolysis, and it has been possible in this way to increase the capacity to 90,000 tons of nitrogen per year, with very small additions to the power plant. The present power consumption is about 220,000 h.p.—200,000 h.p. at Rjukan and the remainder at Notodden.

A trial plant was first erected at Notodden by the Nitrogen Engineering Corporation of New York and this started early in 1928. It was followed in 1929 by a large Haber-Bosch plant at Rjukan erected in co-operation with the I. G. Farbenindustrie, which had previously acquired a considerable holding in the company, and in 1927 took up the whole of the new issue of capital. An interesting feature of the lay-out is that the electrolytic hydrogen plants are situated immediately adjacent to the power houses, the gas being pumped through pipes lines to the nitrogen plants. In the case of the Vermork power station, the principal one supplying Rjukan, owing to the lack of a suitable flat site it was necessary to build an eight-storey building in order to accommodate the cells, and the hourly output of 20,000 cu.m. of hydrogen is piped about 5 kms. to Rjukan. A further quantity of hydrogen for Rjukan is obtained from the Saaheim power and electrolytic-plants. Notodden, which is only one-tenth of the size of the Rjukan plant, functions more or less as a separate unit, producing mainly ammonium nitrate. Part of the ammonia produced at Rjukan is oxidised there for the production of calcium nitrate, for which purpose the old absorption towers of the arc plant are used, but the greater part of the output is shipped in tank cars to the Eidanger nitrate plant on the island of Heroen near Porsgrund. At the latter plant there are 35 oxidation units and four rows of 7 absorption towers each 8 m. in diameter and 30 m. high. Three of these towers are built of iron, and the remainder of granite. The boiler house is fired by pulverised coal, about 45,000 tons of coal being imported per year, and the capacity of the power plant is 8,000 kW.

Chemical Matters in Parliament

Coal Industry (Hydrogenation)

In the House of Commons on May 23, Mr. R. T. Evans (Carmarthen) asked the Secretary for Mines the quantity of fuel oils now produced in this country by the liquefaction of coal and the tonnage of coal used for this purpose.

Mr. J. Colville said he had been asked to reply. By liquefaction of coal, he assumed that his hon. friend referred to the hydrogenation of coal. If so, there was at present no commercial production of oil from coal by that process in this country.

Ammonium Sulphate Production

An Increase in the Netherlands

The Netherlands has risen to an important place in the international situation in ammonium sulphate production, according to the United States Commercial Attache at the Hague. For many years Germany has been the leading export supplier, followed by the United Kingdom and the United States, in the order named. In 1930 the Netherlands became an exporter of importance and now occupies third place in world sulphate export trade. The enormous rise in Netherland exports in the last two years results from the establishment of three large production units. The year 1930 was the first of production on a large scale and although the new industry had hardly reached its stride exports exceeded 1929 by 179 per cent. Last year production was increased, and notwithstanding abnormal domestic and foreign marketing conditions resulting from the breakdown of the international nitrogen cartel, exports advanced 177 per cent. over 1930 shipments and 674 per cent. over 1929. A study of statistics which are available show that net imports during the period 1926-31 there was a net export averaging 71,571 tons.

Professional Unity in the Chemical Industry

By WILLIAM JOHNSON

UNITY for chemists should appeal to our pride, commonsense and self-preservation. Our pride in the community of chemists should at least be equal to that shown by other professional associations. The medical and dental professions are far in advance of us in the completeness of their organisation. The electrical and civil engineers have a home which is worthy of their importance. Commonsense should tell us that it is absurd to have such an array of technical societies competing with each other for members, many of them doing work which another branch is better fitted to carry out. It is a waste of time, labour and money, and must be very inefficient. A rational division of duties would reduce the cost and increase the efficiency.

The modern trend in industry is to form large single units in place of a number of small independent concerns. The recognition of the importance of the chemist within these large organisations is not as great as it was in the old type of business. These large combines also become very powerful in that they are able to control their supply and demand for materials and labour. They interfere with economic laws of supply and demand, which formerly enabled many chemists to regard technical associations with indifference. This interference must be met by a strong organisation of chemists, and there are many sound reasons for this.

Importance of the Chemist

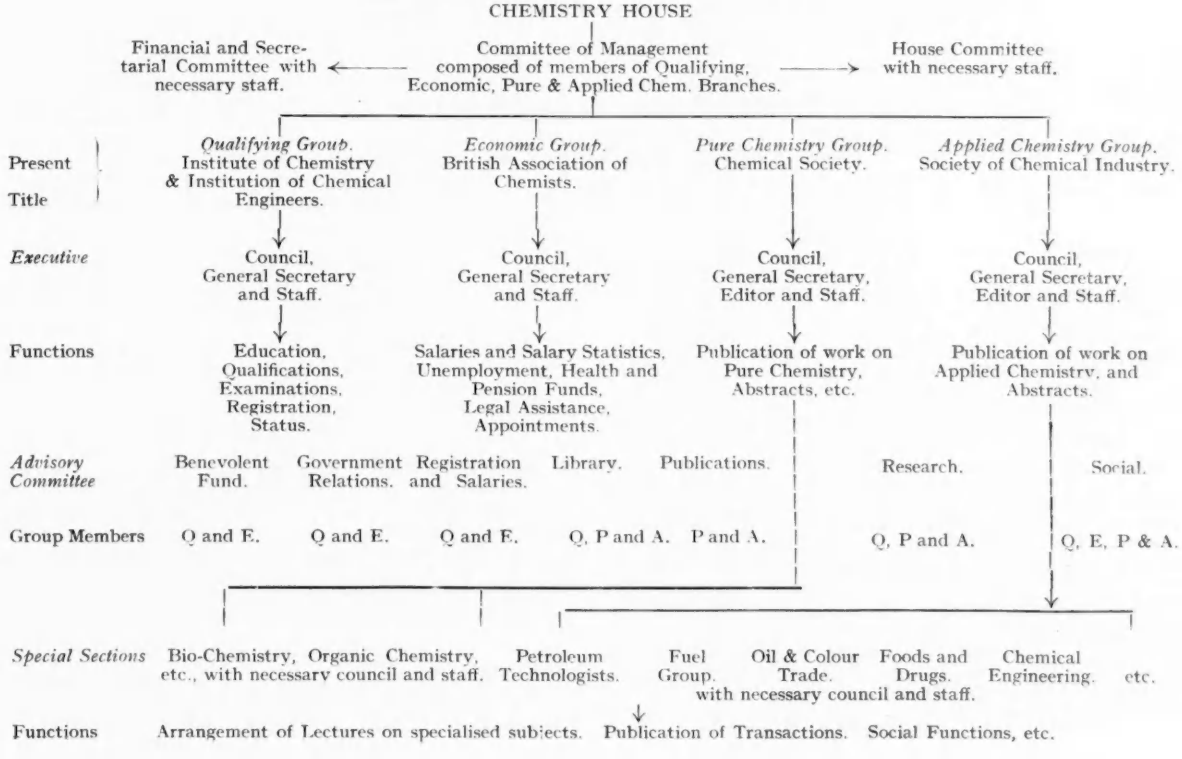
The importance of the chemist is affected by the fact that, whereas in the smaller business he had control of the comparative and manufacturing functions, and in many cases was a part of the executive, in the large combine he shares the comparative function with the costing expert and others, the manufacturing function with the labour and management experts, and on the executive side he is definitely subordinate to the legal and financial experts. Whilst it would be idle to deny the importance of these experts, the chemical industry is basically dependent on the chemists. The better the quality of the chemists, the more likely is the industry to maintain its position. This fact is not in any way affected by the apparent greater importance of proper finance and management when the results of the chemist's discoveries and improvements have reached a commercial stage. It is, therefore, our duty to the industry and the State to do all we can to improve the standard in the profession and to make it more attractive. This cannot be done unless we have a strong organisation, which can maintain a high rate of remuneration. It is the reward that a chemist receives for his services which determines the quality of the recruits to the profession, in that it directly affects the attractiveness of the profession.

A strong chemists' organisation would be able to educate the general public as to the importance of our work on the national health and well-being. The chemist's work in relation to foodstuffs and all the materials used in their preparation is likely to prove as valuable as the work of the medical profession. Such work definitely belongs to the realms of preventative medicine. The chemist's work in reducing the pollution of the atmosphere is another example of national service. It is the national importance of the chemist which justifies the demand for registration, and with it the power to insist that only qualified chemists shall have control of chemical operations.

Form of the Proposed Union

So far the rank and file of the profession have failed to show any very definite demand for a strong organisation. The councils of the various technical societies can do much to bring about unity, but it is clearly wrong in principle for these bodies to carry out amalgamations until their members show a keener desire. The form which the proposed union should take is the first point that would have to be settled, and this is a point which the technical societies could thoroughly explore without the consent of their members. When the general principles had been agreed upon, they could then approach their members, and the result would be almost certainly a great advance towards unity.

Suggested Form of Chemical Organisation


CHEMISTRY HOUSE
Financial and Secretarial Committee with necessary staff.
Committee of Management composed of members of Qualifying, Economic, Pure & Applied Chem. Branches.
House Committee with necessary staff.
Present Title
Qualifying Group. Institute of Chemistry & Institution of Chemical Engineers.
Economic Group. British Association of Chemists.
Pure Chemistry Group. Chemical Society.
Applied Chemistry Group. Society of Chemical Industry.
Executive
Council, General Secretary and Staff.
Council, General Secretary and Staff.
Council, General Secretary, Editor and Staff.
Council, General Secretary, Editor and Staff.
Functions
Education, Qualifications, Examinations, Registration, Status.
Salaries and Salary Statistics, Unemployment, Health and Pension Funds, Legal Assistance, Appointments.
Publication of work on Pure Chemistry, Abstracts, etc.
Publication of work on Applied Chemistry, and Abstracts.
Advisory Committee
Benevolent Fund.
Government Relations.
Registration and Salaries.
Library.
Publications.
Research.
Social.
Group Members
Q and E.
Q and E.
Q and E.
Q, P and A.
P and A.
Q, P and A.
Q, E, P & A.
Special Sections
Bio-Chemistry, Organic Chemistry, etc., with necessary council and staff.
Petroleum Technologists.
Fuel Group.
Oil & Colour Trade.
Foods and Drugs.
Chemical Engineering.
etc.
with necessary council and staff.
Functions
Arrangement of Lectures on specialised subjects.
Publication of Transactions.
Social Functions, etc.

This organisation must be worked out in a scientific manner, so that it is the most important sections which control policy and not the most wealthy or the most influential. Most of the schemes that have been proposed lose sight of this important fact. It is obvious that it is not possible for a society specialising in one small branch of applied chemisty to bring about the desired organisation by amalgamating with two or three similar specialised sections. That would only be a private economy affecting a small section of our community, and of not the slightest interest to the main body of chemists. A union of chemists should be controlled by the four main groups connected with our profession. These groups should be:—(1) The qualifying bodies such as the Institute of Chemistry, and the Institution of Chemical Engineers; (2) the economic group, such as the British Association of Chemists (the Society of Scientific Workers is probably too wide in its scope to be included in a chemists' organisation); (3) pure chemistry, as represented by the Chemical Society, and (4) applied chemistry, as represented by the Society of Chemical Industry.

The Tendency to Bureaucracy

All the other numerous and varied technical societies are specialised branches of the last two groups and should be subordinate to them. The writer has endeavoured to show by means of the chart in page 515 the form of organisation which he considers the most desirable, and the only one which can appeal to all chemists and serve their needs. The amalgamation of the various technical societies is not on the lines adopted in industry. It is a loose combination which keeps the different functions in more or less water-tight compartments, while allowing the maximum of co-ordination between the different interests. It is suggested that one large organisation is not to be desired, in that it would become bureaucratic and tend to lose touch with the individual member. One huge organisation of chemists would be a failure just as the large amalgamations have been in Trade Union circles. By maintaining separate control for each individual group and also for the specialised branches of pure and applied chemistry, it would be possible to ensure that each group or special subsidiary group was managed by those chemists whose inclinations and ability best fitted them for their duties.

The division of labour would not require the employment of a large number of permanent officials. Thus we could retain the present advantage of having the actual control in the hands of chemists who were in daily employment as chemists and not as organisers. Co-ordination between the different activities would be obtained by means of advisory committees appointed from the councils of the different groups. The actual committees required are fairly obvious except in one case, which is referred to in the chart as the research committee. This committee is visualised as acting as an independent and representative body of chemists in matters relating to Government research and State-aided research in the universities. Such an independent body would be useful, and might be able to prevent a great deal of the delay which takes place between the completion of research work and its adoption in a more commercial sphere.

A Working Basis

With regard to the relations of the chemist with this organisation, the following general principles would provide a reasonable working basis. Each fully qualified chemist would be required to pay a fee which would cover the expenses of the four main groups. For this fee he would be entitled to all the privileges which are obtained to-day by membership of these societies. In addition to the minimum contribution to the unemployment fund, he would be required to contribute to the minimum scale of the health fund and possibly a pension fund, except in the case of a chemist who was his own employer or who was already a member of a suitable provident scheme in his own company. There would be a more generous scheme of insurance for those who wished to contribute, just as there is at present in the British Association of Chemists.

Men employed in laboratories whose qualifications were not up to the standard set down by the qualifying group could be admitted on a lower scale and would be entitled to the privileges of the pure and applied chemistry branches, and to a reduced rate of benefits from the economic group. A special section of the economic group could be formed for these men. Non-chemists could be admitted to the pure and applied groups at a special fee, not necessarily a lower fee. Membership of the specialised groups could be obligatory to members of the main society, or one particular section could be compulsory. The amount of the fees required for these special branches would be determined by the cost of running each particular branch. The organisation sketched above would enable many economies to be effected, and we should be able to meet all our obligations by the payment of one annual fee. The increased benefits would more than repay those chemists who were called upon to pay bigger subscriptions.

Synthesis of Vitamin C

Norwegian Researches Published

THE noteworthy paper on the discovery of the formula of vitamin C, which was presented before the Norwegian Academy of Science in Oslo on December 4, 1931, has now been published for the Fridtjof Nansen Foundation.

It was after years of research that Ottar Rygh and his assistants suceeded in determining the chemical formula of vitamin C and in pointing out a simple way of producing the vitamin substance in large quantities from cheap raw materials.

As a result of Rygh's works, narcotine has been shown to be the pro-vitamin C which, upon the ripening of the fruit, is chemically changed to vitamin C. In this manner the two orthomethoxy groups lose their methyl and an orthodiphenol is formed. The synthetic orthodiphenol has been shown to be active against scurvy in guinea pigs when 0.02 to 0.03 mg. is administered daily. The investigations that led to this result were carried out in the following way: Raw juice obtained from oranges by pressing was centrifuged and gently evaporated in vacuum to about one-sixth of its original volume at a temperature not exceeding 25° C.

The concentrated juice was shaken with ether to remove the small suspended oily particles, during which treatment the turbidity disappeared. Sodium hydroxide solution was then added in small portions with air excluded, until the reaction with litmus was very faintly alkaline. It was again extracted with ether and the extraction product evaporated to remove the ether, all operations being carried out in the absence of air.

The residue, which had a strong antiscorbutic power, consisted of a yellow oil mixed with needle-shaped crystals, which were shown to be narcotine. Extensive experiments, in which more than 15,000 oranges were consumed, led to the conclusion that the unripe fruit is rich in narcotine and poor in vitamin C, while the ripe fruit is rich in vitamin, the narcotine disappearing during the ripening of the fruit. Pure narcotine has no antiscorbutic power.

The second part of the problem was to synthesise the vitamin from pure narcotine. Irradiation with ultra-violet rays was first tried, but only a slight change in the biological action of the substance was observed. Then an effort was made to change the narcotine by chemical treatment. The narcotine molecule has two methoxy groups in the ortho position in the meconine part of the molecule. As already known, these methoxy groups can be separated from the molecule by heating with strong hydrochloric acid, with formation of the corresponding phenols. After two hours' treatment the monophenol is formed, and after 6 to 7 days the orthodiphenol. The monophenol showed a slight antiscorbutic action, whereas the orthodiphenol was found to be preventive of scurvy in guinea pigs when administered in doses of 0.02 mg. a day. When as much as 0.1 mg. a day was administered, symptons of overdosage appeared.

Fertilisers and Food Production

Sir Frederick Keeble's New Book

OF all countries in the world, Great Britain is probably the least agricultural. We grow less food in proportion to our needs and maintain relatively fewer workers on the soil than almost any other land. Neglect of agriculture, which followed our obsession for industrial and mercantile pursuits, and resulted in the loss of four to five million acres of arable land, did us apparently little harm during the halcyon days of the 19th century and right up to August, 1914, but the throes of the world-war and its sequelae, the outbreak of economic nationalism, our abandonment of the gold standard and the imperative call to rectify our adverse trade balance, all combined to convince us that in the future we must be less dependent upon imported food supplies than we have been in the past. Although the heroic efforts made in 1917-18 increased our food production by some six million tons, they have not been sustained, and we have reverted to our pre-war conditions of being a "week-end nation." We can feed ourselves from Friday evening to Monday morning, but depend upon imported food supplies to keep us for the rest of the week. In the stressful period of 1917-18, the policy adopted was to grow as much food for direct human consumption as was possible, *i.e.*, cereals and potatoes, for science tells us that we lose roughly about four-fifths of the food energy in a plant when we eat it in the form of an animal product. Accordingly we ploughed up about two million acres of grassland and used them mainly for growing cereals. The expense was great, but was justified as a war time measure.

An Important Issue

An important issue now confronting the nation is whether corn growing or livestock husbandry shall be singled out for preferential treatment, for State aid in the form of protection or quotas for both types of agriculture would make food too dear and handicap us as an industrial exporting nation. In the past few years, owing to an unusual succession of bountiful harvests in the chief corn-growing countries of the world, the re-appearance of Russian cereals on the world-markets, and the general slump in the wholesale prices of all essential commodities, we have been enabled to purchase foreign corn at prices far below the average cost of production in Great Britain, and the ever-increasing expansion of mechanised farming in the great cereal-growing countries indicates that unless we can also mechanise, we shall have no chance of producing as cheaply as they do, although as a measure of insurance we should at least maintain our present position and keep in reserve areas that could be quickly converted to wheat production in case of need. In his evidence before Lord Selborne's Agricultural Policy Sub-Committee during the war, Sir R. H. Biffen stated that "England is naturally one of the best, if not the very best, wheat growing countries in the world." To-day there are many experts who maintain that large areas of land in this country could be economically farmed by modern mechanical methods, and others who think that such methods could only be successful if the price of land were substantially reduced.

Two Branches Mutually Dependent

As farming is practised in Great Britain to-day, the arable and livestock branches are mutually dependent and the maintenance of some kind of balance between the two appears to be essential. There are, however, revolutionaries, like Professor C. Orwin, of Oxford University, who preach the abandonment of our old methods. They would largely abolish mixed farms and crop rotations; they would introduce mechanisation and grow arable crops on large specialised farms depending for their plant food upon chemical fertilisers rather than on farmward manure; tney would also extend smallholdings for the intensive cultivation of fruit, vegetables and other market garden crops, thus absorbing the labour which would be displaced by mechanisation. Furthermore, the conservative agriculturist who would retain the rotational system of cropping, looks askance at the threatened disappearance of wheat as the pivot not only of arable but also of mixed farming.

The other school of thought favours the preferential treatment of livestock farming. Great Britain is essentially a grassland country; three-quarters of the capital invested in agriculture is sunk in livestock, and our imports of meat and other livestock products are much higher in value than those of wheat and other cereals. In his book on "Fertilisers and Food Production" (Oxford University Press, 1932, price 5s) Sir Frederick Keeble, head of the I.C.I. Agricultural Research Station, Jealott's Hill, Berks, appears to throw in his lot with the latter school. He makes no suggestion of ploughing up any permanent grassland, or of cultivating arable land by mechanical methods; his object is to show how production generally could be greatly and immediately increased by the more extensive and intensive use of fertilisers. He points to average crop increments that follow the use of nitrogen, in presence of adequate phosphate and potash, and on the basis of figures that have been obtained at Rothamsted and elsewhere predicts the following increases in crop-yields: Cereals 19 per cent., potatoes 18 per cent., beet sugar 13 per cent., mangolds and other roots 7 per cent., hay from permanent or temporary grass 41 per cent.

Increased Production

All increased production, excepting that from potatoes and sugar-beet, is allocated to feeding livestock. On the assumption that a crop increment of 9 cwt. of hay obtained from an application of 1 cwt. of ammonium sulphate, plus minerals, and an increase of 67 per cent. in the stock-carrying capacity of our pastures by intensive manuring on the Hohenheim system, it is estimated that within 10 years the cattle population in the U.K. could be increased from about 8 to 16 millions, sheep from 24 to 34 millions, pigs from 3 to 9 millions and poultry from 6 to 110 millions. In this way home-production of meat would rise from 41 to 91 per cent. of our total consumption, dairy products from 37 to 77 per cent., and vegetables, fruit, etc., from 79 to 83 per cent.

Apart from capital expenditure on providing necessary buildings and water supplies, and the cost of organising stock-raising on a large scale, the author's scheme would involve the additional cost of purchasing nearly 11 million tons of imported concentrated feeding stuffs as against 5 million tons to-day. Nevertheless, it is estimated that not less than £100,000,000 would be knocked off our yearly bill of £388,000,000 for imported food. There are, however, prospects that we may grow more winter food for stock than formerly; we may solve the problem of drying economically young grass, which is highly nutritious and makes an excellent winter feed, and the new Finnish method of ensiling crops, including grass, with the addition of hydrochloric acid may turn out to be as effective in Great Britain as it has proved to be in Finland.

A Strong Case Made Out

Although parts of the book are likely to evoke criticism, *e.g.*, the adoption of average increases of 9 cwt. hay and 67 per cent. stock-carrying capacity of pastures from the use of sulphate of ammonia and minerals, the case made out for quickly and greatly increasing home-grown food by means of fertilisers is a very strong one. The suggested large increases in home-production of dairy products, mutton and lamb, will not appeal to New Zealand and Australia, but conceivably the author would not be averse to lowering his estimates for these items if New Zealand and Australia would reciprocate by taking our manufactured products. Food-production could, of course, be increased by other methods than by fertilisers, and consideration of these is not omitted; in particular the need for more liming is especially emphasised, and many agriculturists would have preferred this method of improving soil-fertility to have been included in the author's "immediate" programme. The chapters on grassland cultivation are of outstanding interest, and generally the whole book can be warmly recommended not only to the argiculturist, but to the chemist who is interested in fertilisers and to the layman who takes an intelligent interest in the problems of the day. It is well written, and those who have to interpret the results of scientific research would do well to study its style, which is characterised by clarity, fluidity and literary grace.

British Cotton and Wool Dyers' Association

Thirty-four Per Cent. Trade Increase

PRESIDING at the 33rd annual meeting of the British Cotton and Wool Dyers' Association at Manchester, on May 25, Mr. F. J. Smith, chairman of the Association, said that twelve months ago there seemed no direction to which they could look expecting a change from the dull industrial conditions then prevailing. In all parts of the world they were met by successful competition from producers in other countries and even into our home market foreign manufactured goods were coming in ever increasing quantities. At home in the cotton industry effort was more concentrated on the scheme for cutting down redundant plant than on devising means of dealing with this foreign competition. For the whole period to September 30 these conditions prevailed, and it was not until the abandonment of the gold standard that they began to see a little daylight. It was then found that the profitable importation of many cotton and wool yarns and fabrics to this country was no longer possible, and those who hitherto bought these articles turned their attention to British made goods.

An Increasing Demand

The home textile trade quickly found an increasing demand, and it was soon seen that the changed circumstances enabled exporters to sell British goods in markets where formerly they had not been able to compete. As a consequence they had to increase output and start up machinery which had been idle for more than twelve months.

Throughout the period from October to March they had been much better employed than earlier in the year, and the result was seen in the balance sheet of the year's working. It was well, however, to utter a word of warning to prevent undue optimism. There did not appear to be any improvement in general world conditions. The world demand for textiles was no greater than before, and their present increased trade in cotton and wool goods was almost entirely due to the fact that the departure from the gold standard preserved to them their home market, and enabled them to sell goods more easily to other countries abroad. This factor was one which might not last, and although they might protect their home trade by means of import duties, the present increased export trade would be difficult to retain if sterling once more approximated to its old value. The position was not a satisfactory one, for it only served to show that unless they worked under exceptional conditions the textile trades of this country (and more particularly the cotton trade) could not produce goods to sell at prices to compete with makers abroad, and so whenever conditions of selling became equal they could expect our export trade to still further diminish. The decreased purchasing power of the pound had naturally increased the cost to them of all dyestuffs and other articles they had to buy from abroad, and British manufacturers of dyestuffs had also advanced their prices to a considerable extent. They were very loth to do anything to increase the cost of manufacture of textiles, in which competition was very keen, but they had been forced to ask their customers to pay an advance in prices, to cover the extra demand by the various dye makers and chemical manufacturers.

The Future Outlook

It was difficult to make any forecast with regard to the future. They seemed to have looming in front of them trouble in the weaving industry of the cotton trade, and any dislocation of business there was bound to reflect on their trading, but given freedom from trouble of this character he did not see any signs of a great change from the conditions under which they traded at present. They were working under the most economical conditions, and were ready to avail themselves of every opportunity that presented itself of doing business.

The improvement in the volume of trade during the last six months of the fiscal year showed an increase of thirty-four per cent. in weight over the first six months of the year.

A dividend of £3 3s. 4d. per cent. was declared. No dividend was paid last year.

Replying to a vote of thanks, the chairman said it went without saying that the past year had been a very arduous one, one in which they had had to devote all their time and energies to finding some profit. It was perhaps because they had been more lucky than other associations that they had been able to pull out of the mess and show a bigger return than some of the other concerns had. They had derived more benefit from the inability now to bring into this country foreign made textiles perhaps than other associations had. They felt the advantage immediately the gold standard was abandoned and increased trade had remained until this present time. He hoped it would continue.

Parent Coal Carbonisation Trust

Petition Again Adjourned

IN the Company's Winding-Up Court on Monday, Mr. Justice Eve had before him a petition to wind-up the Parent Coal Carbonisation Trust, Ltd.

Mr. Greenland, for the petitioner, said his client had now been paid in full and he would like the petition dismissed.

Mr. Grant, K.C., for the company, did not desire this. A scheme had been prepared which provided for the payment of the debts of the company.

Mr. Buckmaster said he applied for his client to be substituted, he being an unpaid employee of the company.

Mr. Grant said the company had not paid Mr. Greenland's client. He had been paid by another party who had advanced the money.

Mr. Grant applied for a three weeks' adjournment.

His lordship adjourned the petition for a week, substituting Mr. Buckmaster's client as the petitioner.

Birmingham Metallurgical Society

Annual Meeting

THE annual meeting of the Birmingham Metallurgical Society was held on May 31, when the following officers were appointed: Mr. A. A. Jude, president; Mr. A. C. Craig, treasurer; Messrs. Poppleton and Appleby, auditors; Mr. F. G. Tustin, secretary; Messrs. W. A. Benton, N. P. Allen, J. Fallon and H Davies, vice-presidents; Messrs. A. Pinkerton, A. L. Molineaux, V. F. Jordan, L. J. Meyrick and F. W. Spencer, members of the council.

The annual report, which was approved, stated that the duties allocated to the co-ordinating committee had been competently fulfilled and its efforts had resulted in financial economy and a conspicuous increase in the attendance of members at the various meetings. The society had placed before this body the desire of members generally for better accommodation, in view of the large increase in the attendance, and it was probable that for next session meetings would be arranged at the University,. Edmund Street. The revised scheme for the student's prize introduced last session was highly successful and resulted in eight essays being submitted for adjudication. As the adjudicating committee could not separate two excellent papers of equal merit, the society's bronze medal was awarded to each competitor and the prize of five guineas was divided. The successful entrants were Mr. A. A. Timmins for an essay entitled "Progress in the Development of Corrosion-Resisting Steels" and Mr. H. F. Allwood for a paper entitled "The Separation of Aluminium and Magnesium."

A GERMAN company is reported to be manufacturing a synthetic substitute for gum tragacanth from water soluble methyl cellulose. Its properties and uses are said to closely resemble those of gum tragacanth. It is claimed to be resistant to fermentation and souring or moulding, and also is soluble after coagulation.

Yorkshire Dyeware & Chemical Co.

Expansion of Capital

AN increased profit, larger dividend distribution, and a £50,000 share bonus are the features of a very satisfactory report for the year ended March 31, 1932, issued by the Yorkshire Dyeware and Chemical Co., Ltd., of Leeds. The net profit has risen from £17,009 a year ago to £22,410 for the past year, and in addition to the repetition of a dividend of 10 per cent. on the Ordinary shares, the directors recommend a bonus of 9d. per share. The carry forward will then be increased from £4,919 to £6,638. Notice is also given of an extraordinary general meeting to be held on June 8 to give effect to a recommendation that the capital of the company be increased to £200,000 by the creation of 200,000 new shares of 5s. each. By capitalising £50,000 of the reserve fund, it is proposed to issue these shares free to holders of the existing shares of 15s. each, whose shares will then be consolidated into the denomination of £1 each. The company's share capital, which now consists of 200,000 shares of 15s. each, will thus become 200,000 shares of £1 each, while the reserve fund will be reduced from £110,000 to £60,000.

British Association of Chemists

Annual Meeting of the Manchester Section

THE annual meeting of the Manchester Section of the British Association of Chemists was held at the Grand Hotel, Manchester, on May 25, Mr. E. N. Marchant being in the chair. In his annual report, the secretary stated that in spite of the present economic conditions in industry and of the fact that a number of members who had lost touch with the Association had been written off the books, there was a welcome increase in the membership of the Section.

Mr. H. T. F. RHODES, after referring to the good feeling which existed between the Section and other societies in Manchester, and to the extent to which co-operation between the various societies was taking place there, expressed his appreciation of the manner in which the work of the Section was carried out.

The officers and committee elected were:—Chairman, Mr. M. F. S. Choate; secretary, Dr. J Avery; treasurer, Mr. T. O. Morgan; committee, Messrs. H. Adams, W. M. Coates, J. H. Dent, C. W. Doxey, A. Gill, A. Hill, W. E. Kay, E. N. Marchant, and Miss Rona Robinson, who together with Mr. J. T. Allpass, Mr. F. Page Evans, Mr. C. Garner, Dr. J. L. Hankey, Mr. C. A. Mawson, and Mr. F. Sowerbutts, constitute the new committee.

Mr. MARCHANT, in thanking the retiring members for their services, gave his opinion that the changes would prove to the advantage of the Section, and the business meeting closed with a vote of thanks to the retiring officers, proposed by Mr. Gill and supported by Mr. Scholefield.

Mr. F. SCHOLEFIELD then inaugurated a discussion on "Where does the Chemist Stand To-day?" He urged chemists to concern themselves with the world's economic problems which would have to be solved by the application of scientific thought and methods. The advantages and disadvantages of rationalisation were discussed and he pointed out that this ought to lead to amalgamation amongst chemists. He deplored the tendency of some firms to economise by cutting down research staffs, as business could not carry on unless research proceeded, and he stated that in only one country in the world had an organised attempt been made to deal with production on a national scale.

Mr. MAWSON made a plea for inflation, stating that the economic problems would not be solved until money was put in the pockets of the consumers, whilst Mr. Hill attributed the trouble to lack of confidence and too slow a circulation of money.

The advantages of a fixed programme of production were stressed by Mr. Barlow, and Dr. Ward commented upon the lack of appreciation of scientific method amongst people as a whole. An alteration in the monetary system on an international basis was advocated by Mr. Rhodes, who also favoured a policy of scientifically controlled inflation.

The Willard Gibbs Medal

Awarded to Dr. E. C. Franklin

FOR a lifelong study of liquid ammonia solution "which opened up a new field" in organic chemistry, Dr. Edward Curtis Franklin, professor emeritus of organic chemistry in Leland Stanford University, California, has been awarded the Willard Gibbs Medal for 1932 by the Chicago Section of the American Chemical Society, the presentation of the medal taking place at Chicago on May 20.

Dr. Franklin's work on liquid ammonia solutions has opened up an entirely new field, and also modified profoundly our views on aqueous solutions. He has made a lifelong study, characterised by insight, thoroughness and experimental skill, or reactions in liquid ammonia, and chemists, both organic and inorganic, are aware of the profound effect of this work upon modern conceptions of the relation between the solvent and the chemistry of the solute. These researches, it is believed, may profoundly influence industrial operations in which chemical reactions in water are found to be unsuitable. They should lead to the use of other solvents beside liquid ammonia, as in the case of sulphur-dioxide, used for the separation of deleterious substances in lubricating oils, because these substances have been found to be most highly soluble in it.

A broad generalisation underlying the chemistry of nitrogen compounds and bearing to these compounds the same relationship that the present theory of acids, bases and salts bears to oxygen compounds is the culminating result of Dr. Franklin's work. The importance of this theory will grow as more is learned of the forces that hold atoms together in molecules, and the chemist of the future who studies the chemical affinity of the nitrogen atom from the viewpoint of theories yet to be conceived will find a wealth of compounds of the element first prepared by Franklin, which will help in reaching the ultimate solution of his problem.

Dr. Franklin's study of the metallic derivatives of ammonia has led to the preparation of a series of compounds that increased knowledge of the chemical affinity of the nitrogen atom. His work is essentially a fundamental study of chemical reactions and ionisations of salts, acids and bases in liquid ammonia, an extension of Lavoisier's study of acids, bases and salts in water. His discovery that many organic compounds containing nitrogen are electrolytically dissociated in liquid ammonia gave a new view of this type of dissociation which, it is believed, will be of the greatest significance when the conception of the electron is applied to organic compounds.

Dr. Franklin's studies in ammonia chemistry, begun about 35 years ago at the University of Kansas, have been continued up to the present day under the guidance of Franklin himself and of many of the students and associates inspired by his teaching. He was born in Geary City, Kansas, in 1862, and received the degree of B.S. from the University of Kansas in 1888 and M.S. in 1890. Since 1906 he has been a full professor at Stanford University becoming professor emeritus in 1929. In 1925 he was awarded the William H. Nichols Medal by the New York Section of the American Chemical Society. The Gibbs Medal, which he has received, was founded by William A. Converse, and was first awarded in 1911 to Svante Arrhenius, of Sweden. It is named for Josiah Willard Gibbs, professor of mathematical physics at Yale from 1871 until 1903, who although not primarily a chemist did much to advance the science of chemistry. Previous recipients include Madame Curie, of France, Sir James C. Irvine, of Scotland, L. H. Balkeland, Iro Remsen, F. C. Cottrell, Julius Steiglitz, Moses Gomberg, Irving Langmuir and other Americans.

Fishery By-Products in Chosen

IT has been estimated that approximately 80 per cent. of the annual sardine catch of Chosen is converted into fish meal and fertiliser material. Total production increased from 52,300 tons in 1927 to 79,500 tons in 1929 and 73,400 tons in 1930. Experts have been investigating the possibility of greater utilisation of fishery by-products. In July, 1931, an arrangement was made between the Mitsubishi and the Chosen Marine Products Guild whereby the oil plants agreed to turn over their by-products to the Chosen Chisso Hiryo Kaisha (Chosen Nitrogenous Fertiliser Co.)

Chemical and Metallurgical Corporation

Reorganisation of Capital

ACCOMPANYING their report for 1931 the directors of the Chemical and Metallurgical Corporation announce the terms of a capital reorganisation scheme. In 1931 there was a profit before charging depreciation, of £8,831 (against £8,003 for 1930). It is stated that in spite of the trade depression the turnover was increased, while costs were reduced. Under the scheme the book value of the physical assets will be reduced and the figures for patents and rights (which stand at £251,869) and the suspense account (which totals £532,459) will be eliminated from the balance sheet. The scheme will pave the way for the liquidation of the bank overdraft, amounting to £81,619, which is at present secured by 7½ per cent. notes redeemable at call. The guarantors will be willing to accept a continuation of these notes with interest at 8 per cent. and with redemption over 10 years.

It is proposed to reduce the issued capital from £862,041 to £210,340 by reducing the nominal value of each Preference share from £1 to 10s. and of each Ordinary share from 2s. to 4d. Preference dividend arrears (which date from January 1, 1926) are also to be cancelled. Preference shareholders are asked to accept, instead of 8 per cent. fixed cumulative dividend, 8 per cent. fixed non-cumulative dividend, and 8 per cent. (making 16 per cent. in all) participating dividend, the latter to be payable out of one-half of the balance of distributable profits each year after meeting the cumulative dividend. After the reduction the shares are to be consolidated into £1 Preference shares and 2s. Ordinary shares as at present. In a winding-up Preference shares are to have priority to the extent of £2 a share.

It is also proposed to adopt new articles of association. Among the alterations is the substitution of a 5 per cent. dividend for the present figure of a 25 per cent. dividend after the payment of which the directors become entitled to further remuneration. The scheme has the approval of the Shareholders' Committee and will be considered at a meeting called for June 21.

Chemicals in Modern Warfare

Report of the Geneva Committee

THE special committee appointed by the General Commission of the Disarmament Conference at Geneva on May 10 to examine the question of chemical and bacteriological weapons in relation to the principle of qualitative disarmament completed its draft report to the General Commission on May 30. The committee has made separate studies of chemical weapons and methods of warfare, bacteriological weapons, and incendiary weapons. It has unanimously agreed that chemical weapons and methods of warfare can be classed among those most threatening to civilians. The majority of the committee also feel that these weapons and methods are specifically offensive.

The report embraces a series of resolutions, one of which declares that there should be included in a scheme of qualitative disarmament the use, for the purpose of injuring an adversary, of all natural or synthetic noxious substances, whether solid, liquid, or gaseous, whether toxic, asphyxiating, lachrymatory, irritant, vesicant, or capable in any way of producing harmful effects on the human or animal organism. The committee observes that the above definition should not apply to smoke or fog screens, provided that such smoke or fog is not liable to produce harmful effects under normal conditions.

The view is held that the use of pathogenic microbes for the purpose of injuring an adversary is condemned by the conscience of humanity, and that all methods for their projection, discharge, or dissemination in any manner, anywhere, should be included in a scheme of qualitative disarmament.

The committee states that the use of incendiary projectiles involves a particularly grave threat to civilians, and that they should also be included. The committee observes that this resolution does not apply either to appliances specially constructed to give light or to projectiles and appliances capable of accidentally producing fire.

Important Dock Rates Decision

Lever Brothers' Appeal Succeeds

AN appeal by Lever Bros., Ltd., against the assessment of the Bromborough Dock succeeded, at Cheshire Quarter Sessions, on May 30 The appeal was in respect of two hereditaments, the rateable value of land covered by water having been assessed at £4,200 and that of dock buildings at £2,000.

Mr. R. M. Montgomery, who represented the appellants, said the only question was whether the dock was a freight transport hereditament. The definition of this in the 1928 Rating and Valuation Act was, "A hereditament occupied and used wholly or partly for dock purposes as part of a dock undertaking, being an undertaking whereof a substantial proportion of the volume of business is concerned with the shipping and unshipping of merchandise not belonging to or intended for the use of the undertakers."

The dock had been in use since February, 1931, and up to September 30, 1931, the percentages of the import and export traffic in respect of certain firms were:—Joseph Crosfield and Sons, 2 per cent.; Lever Bros., Ltd., 9 per cent.; Ocean Harvest, Ltd., 1 per cent.; Southern Whaling and Sealing Co., Ltd., 1 per cent.; Unilever, Ltd., 85 per cent.; sundry firms, 2 per cent.; less than 1 per cent. in respect of Wm. Gossage and Sons, Ltd. With regard to the words "ore intended for the use of" Unilever, Ltd., were consignees for 85 per cent., which went to Jos. Crosfield and Sons, Wm. Gossage and Sons, Hodgson and Simpson, Ltd., R. S. Hudson, Ltd., Lever Bros., and Planters Foods, Ltd. It was clear that a large proportion of the business was connected with merchandise not intended for the use of the undertakers, Lever Bros. There were, of course, certain holding relations in connection with shares between several of those companies and Lever Bros., and the suggestion made by the Assessment Committee was that whatever merchandise was for the use of a company in which, directly or indirectly, Lever Bros. had some interest, was to be regarded as being for the use of Lever Bros. The appellants' contention was, however, that legally each company was a separate entity.

Mr. Maxwell Fyfe, for the respondent, the Wirral Assessment Committee and the Rating Authority for Bebington and Bromborough Urban District, submitted that the business of the dock was all part of the activities of what was substantially one undertaking. For the purposes of the Rating Relief Acts the court were entitled to look at actualities and ignore legal technicalities. Under the Bromborough Dock Act, apart from the general law, the use of the dock was restricted to goods of Lever Bros. and those so intimately connected with them as to be indistinguishable.

After Mr. Maxwell Fyfe had dealt further with the legal aspect of the question, the chairman of the bench (Mr. J. F. T. Royds) said the appeal would be allowed with costs, and the hereditaments would be placed in the special list as freight transport hereditaments.

Beilby Memorial Awards

Recognition of Original Work

FROM the interest derived from the invested capital of the Sir George Beilby Memorial Fund, at intervals to be determined by the administrators representing the Institute of Chemistry, the Society of Chemical Industry, and the Institute of Metals, awards are made to British investigators in science to mark appreciation of records of distinguished original work, preference being given to investigations relating to the special interests of Sir George Beilby, including problems connected with fuel economy, chemical engineering and metallurgy. Awards are not made on the result of any competition, but in recognition of continuous work of exceptional merit, being evidence of distinct advancement in knowledge and practice.

The administrators of the fund are the presidents, the hon. treasurers, and the secretaries of the three participating institutions, who will meet in the latter part of June, and will be glad to have their attention directed to outstanding work of the nature indicated. Communications should be addressed to the Convener, Sir George Beilby Memorial Fund, Institute of Chemistry, 30 Russell Square, London, W.C.1, not later than June 14.

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Chemical Industry Lawn Tennis Tournament

First Round Results: Second Round Draw

THE first round of the second annual Chemical Industry Lawn Tennis Tournament for THE CHEMICAL AGE silver cup was completed on Monday, and the draw for the second round was made on Wednesday. This year's tournament attracted a total entry of 46 men's doubles, and there were 14 matches in the first round, with 18 byes, leaving 32 pairs to participate in the 16 matches in the second round. Despite the abnormal weather conditions which prevailed throughout May, keen interest was shown in most of the first round matches, and some close finishes were recorded. The results are given below.

For the second round draw, the provinces have again been divided into areas as far as practicable to minimise the inconvenience of travelling. Competitors should note that all the matches in the second round must be played off by **June 20,** and the results, signed by all four players (winners and losers) must be sent by the winners to the Editor of THE CHEMICAL AGE, Bouverie House, Fleet Street, London, E.C.4, immediately after each match and must reach the office of THE CHEMICAL AGE not later than 9.30 a.m. on June 22. It would facilitate the arrangement of the later rounds if the results could be received as much earlier as possible. Competitors are reminded of the following extracts from the rules of the tournament: (Rule 4) The best of three advantage sets shall be played in all matches. (Rule 8) Except in the case of the final, players drawn against each other must make their own arrangements for playing off their match on a court mutually agreed upon; in the event of disagreement the first pair drawn (as shown in the left hand side of each column) shall have the right to choose the ground (Rule 11). If any players be not present at the agreed place or time of the match, opponents shall be entitled to a walk-over, after having allowed reasonable time (say, a maximum of one hour) for the others' appearance. If players find it impossible to play their match on the day originally chosen, they must play it on any other day, to which both sides agree, within the stipulated period.

First Round Results

G. F. Hammond and L. Giltrow (Williams (Hounslow), Ltd.) beat W. Backinsell and R. A. Nottingham (Le Grand, Sutcliff and Gell, Ltd.) 6—1, 6—2.

A. Collins and H. Sibley (British Oxygen Co., Ltd.) beat L. J. Loveday and F. G. Neale (Doulton and Co., Ltd.), 6—0, 6—0.

C. S. Carter and S. A. Horstman (B. Laporte, Ltd.) beat L. G. Williams and H. H. Dalby (Doulton and Co., Ltd.), 6—2, 6—3.

W. Collard and E. Thomas (Dussek Brothers and Co., Ltd.) beat H. R. Rowlinson and R. A. Whiteman (British Drug Houses, Ltd.), 6—3, 1—6, 8—6.

S. J. Sharman and H. R. Whitaker (Williams (Hounslow), Ltd.) beat G. Harley and G. Hale (Dussek Brothers and Co., Ltd.), 6—3, 6—1.

E. Thomsett and R. Welsh (British Oxygen Co., Ltd.) beat N. Hogg and H. G. Short (Riley, Harbord and Law), 6—4, 7—5.

F. Bateman and G. Smith (Dussek Brothers and Co., Ltd.) beat G. O. Smith and E. Smith (Riley, Harbord & Law), 6—4, 3—6, 6—4.

M. B. King and R. H. Hornsby (Howards and Sons, Ltd.) beat D. G. Blow and K. L. Fuller (British Drug Houses, Ltd.), 7—5, 6—3.

S. E. Chaloner and W. Speakman (Monsanto Chemical Works, Ltd.) beat P. A. Tunstall and John H. Fisher (Salt Union, Ltd.), 8—6, 6—0.

A. J. Buck and A. C. Hitchon (Bakelite, Ltd.), walk over, J. Ferguson Davie and L. Jones (Chance and Hunt, Ltd.), scratched.

C. Minkleston and W. J. Wood (B. Laporte, Ltd.) walk over, A. Whittle and W. A. Thompson (British Drug Houses, Ltd.) scratched.

W. A. Robbins and H. Nichols (Le Grand, Sutcliff and Gell, Ltd.) walk over, W. J. Dauncey and E. Browne (G. A. Harvey and Co., Ltd.) scratched.

Idris Williams and T. Clarke (Monsanto Chemical Works, Ltd.) walk over, R. C. Pennington and J. Pope (Wm. Gossage and Sons, Ltd.) scratched.

J. S. Boyd (Scottish Dyes, Ltd.), and G. Rae (I. C. I. Nobels, Ltd.) walk over. W. G. Hiscock and A. W. Clapham (Scottish Dyes, Ltd.) scratched. (The result in this instance is awarded to the pair first drawn under Rule 7 owing to no result being reported by the players.)

Second Round Draw

Following are the details of the second round draw. All matches must be played by **June 20,** and the results must reach the Editor of THE CHEMICAL AGE by 9.30 a.m. on June 22 at the latest.

W. G. Baldock and **H. W. Drew**
Williams (Hounslow), Ltd. (Phone: Hounslow 2929.)

v

J. E. Shirreff and **G. G. Stanford**
Johnson, Matthey & Co., Ltd., 78, Hatton Garden, E.C.1. (Phone: Holborn 6989.)

F. G. Pretlove and **D. B. Hodgson**
Geo. Scott & Son (London), Ltd., Bradfield Road, Silvertown, S.E.16. (Phone: Albert Dock 2026.)

v

F. C. White and **A. W. White**
Howards & Sons, Ltd., Uphall Works, Ilford, Essex. (Phone: Ilford 1113.)

C. H. B. Jones and **Eric Cox**
Anglo-Persian Oil Co., Ltd., Britannic House, Finsbury Circus, E.C.2. (Phone: National 1212.)

v

W. A. Robbins and **H. Nichols**
Le Grand Sutcliff & Gell, Ltd., The Green, Southall, Middlesex. (Phone: Southall 2211.)

C. Minkleston and **W. J. Wood**
B. Laporte, Ltd., Kingsway, Luton. (Phone: Luton 891.)

v

E. Thomsett and **R. Welsh**
British Oxygen Co., Ltd., Angel Road, Upper Edmonton, N.18. (Phone: Tottenham 2488.)

P. Smith and **B. T. Francis**
Bakelite, Ltd., 68, Victoria Street, S.W.1. (Phone: Victoria 5441.)

v

G. F. Hammond and **L. Giltrow**
Williams (Hounslow), Ltd. (Phone: Hounslow 2929.)

L. Seabrook and **R. Frost**
British Oxygen Co., Ltd., Angel Road, Upper Edmonton, N.18. (Phone: Tottenham 2488.)

v

F. Hannon and **W. Ward**
Dussek Bros. & Co., Ltd., Verney Road, Rotherhithe, S.E. (Phone: Bermondsey 2634.)

A. G. R. Clarke and **F. E. Peake**
G. A. Harvey & Co. (London), Ltd., Woolwich Road, S.E.7. (Phone: Greenwich 0020, extension 311.)

v

D. Newton and **C. E. Davis**
Allen & Hanburys, Ltd., Bethnal Green, E.2. (Phone: Bishopsgate 3201, ext. 82.)

A. A. Killick and **G. A. Brittain**
B. Laporte, Ltd., Kingsway, Luton. (Phone: Luton 891.)

v

W. L. Alldis and **S. Perridge**
Chemicals & Coke Ovens, Ltd., Vintry House, Queen Street Place, E.C.4. (Phone: Central 1411-2.)

S. J. Sharman and **H. R. Whitaker**
Williams (Hounslow), Ltd. (Phone: Hounslow 2929.)

v

J. W. Urban and **F. S. Mortimer**
Monsanto Chemical Works, Ltd., Victoria Station House, Victoria Street, S.W.1. (Phone: Victoria 1535.)

F. Bateman and **G. Smith**
Dussek Bros. & Co., Ltd., Verney Road, Rotherhithe, S.E. (Phone: Bermondsey 2634.)

v

L. F. Grape and **R. C. Mugridge**
All communications: R. C. Vandermeulen, Borax Consolidated, Ltd., 16, Eastcheap, E.C.3. (Phone: Royal 1450.)

M. B. King and **R. H. Hornsby**
Howards & Sons, Ltd., Uphall Works, Ilford, Essex. (Phone: Ilford 1113.)

v

A. Baxter (The United Yeast Co., 238, City Road, London. Phone: Clerkenwell 0303) and **V. J. Prosser** (John Haig & Co., 2, Pall Mall East, London. Phone: Whitehall 1040).

A. Collins and
H. Sibley
British Oxygen Co., Ltd., Angel Road, Upper Edmonton, N.18. (Phone: Tottenham 2488.)

Idris Williams and
T. Clarke
Monsanto Chemical Works, Ltd., Ruabon, N. Wales. (Phone: Ruabon 3.)

v **C. S. Carter** and
S. A. Horstman
B. Laporte, Ltd., Kingsway, Luton. (Phone: Luton 891.)

v **J. S. Boyd**
(Scottish Dyes, Ltd.), Grangemouth. (Phone: Grangemouth 182.)
G. Rae
(I.C.I. Nobel's, Ltd., Westquarter Factory, Falkirk). (Phone: Polmont 15.)

W. B. Miller and
G. Lord
British Celanese, Ltd., Spondon, Nr. Derby. (Phone: Derby 2200.)

W. Collard and
E. Thomas
Dussek Bros. & Co., Ltd., Verney Road, Rotherhithe, S.E. (Bermondsey 2634.)

A. J. Buck and
A. C. Hitchon
Bakelite, Ltd., Redfern Road, Tyseley, Birmingham. (Phone: Acocks Green 557).

v **E. G. Almond** and
G. E. Mountney
Bakelite, Ltd., Redfern Road, Tyseley, Birmingham (Phone: Acocks Green 557.)

v **C. G. Copp** and
W. W. Marchant
Doulton & Co., Ltd., High Street, Lambeth, S.E.1. (Phone: Reliance 1241.)

v **S. E. Chaloner** and
W. Speakman
Monsanto Chemical Works, Ltd., Ruabon, N. Wales. (Phone: Ruabon 3.)

New Technical Books

AN INTRODUCTION TO ORGANIC CHEMISTRY. By Roger J. Williams. Second edition, pp. 585. Chapman and Hall, Ltd. 21s. net.

THE desire to rationalise more fully the subject of organic chemistry was the basic reason for publishing the first edition of this work. Most reactions, especially of the simpler compounds, take place in a manner which can be predicted by means of acceptable theories and in the light of the behaviour of related compounds. These relationships are pointed out by the author, who makes them an important part of discussions in which an attempt is made to present available material in the form of a connected and understandable story. In the first part of the book each compound or group of compounds is studied from the standpoint of chemical behaviour, methods of formation and preparation being postponed until the student is in a position to grasp their significance. Brief general discussions, however, are given of a number of topics which are outside the scope of formal organic chemistry, in order to broaden the student's appreciation of many essential points. These topics include solubility, relationships, the cleaning action of soaps, explosives, colloidal solutions, enzyme action, indicators, etc. Short biographical footnotes are also inserted concerning chemists who are mentioned in the text, and references are made to numerous books where the interested student may obtain further information along particular lines. The physical constants of compounds and solubility data are given in tables which are distributed throughout the various chapters of the book. By the revision of the text of the first edition (1927) it has been possible to accomplish several desired ends. Newer developments in carbohydrate chemistry have made necessary material changes in that section, and recent commercial developments connected with aliphatic compounds have also merited attention, whilst the treatment of dyes and intermediates has been altered in accordance with the most recent available information.

* * *

ORGANIC SYNTHESES (COLLECTIVE VOLUME I). Edited by Henry Gilman. Pp. 564. Chapman and Hall, Ltd. 37s. 6d. net.

THIS collective volume represents a thorough revision of the material contained in the first nine annual volumes of "Organic Syntheses" which commenced publication in 1921. Apparently there are several objectives for such a collective volume, the realisation of which will extend the usefulness of the series. In the first place, it is convenient to have a large number of preparations in a single volume; secondly, new and improved directions can be included to replace or supplement earlier preparations; thirdly, a large number of relatively minor but significant corrections have been made, and many suggestions have been forthcoming for improving specific preparations. Further, the large number of preparations contained in a collective volume makes it more practicable to have several useful indexes, concerned with reactions, compounds and formulæ. The reaction index lists most of the preparations in accordance with such well-defined reactions as halogenation and oxidation, and also designates the reagent used to effect the reaction. Such a system should prove of value in the selection of experimental conditions for the preparation of compounds which are not now listed.

CHEMICAL ENGINEERING AND CHEMICAL CATALOGUE. Edited by D.M. Newitt. London: Leonard Hill, Ltd. 10s.

SIR ROBERT HADFIELD, BT., contributes a foreword to the eighth edition of the "Chemical Engineering and Chemical Catalogue," in which he expresses the view that we may expect the results of Great Britain's new tariff policy to become increasingly apparent as time goes on. "It cannot fail to stimulate the demand for home products," he says, "and when existing stocks of foreign goods are depleted, a big trade revival must be the consequence." He pays a well deserved tribute to the catalogue as a work of reference, which he commends to the chemical industry as an industrial Thesaurus, stimulating imagination, economising time, saving money and encouraging British enterprise. Readers of the catalogue will heartily endorse the congratulations extended by the publisher in his foreword to Dr. Newitt upon the care he has exercised and the accuracy he has attained in the eighth edition. The index has been extended almost beyond recognition and the main index has been translated into German. Further additions have been made to the data and tables. The whole of the old bibliography has been scrapped and an entirely new bibliography, containing some 2,000 books, has been compiled under the able editorship of Dr. H. B. Cronshaw. The catalogue is printed on specially made book paper, which gives 50 per cent. less bulk than that previously used.

* * *

ANNUAL REPORTS ON THE PROGRESS OF CHEMISTRY, Volume XXVII (1931). Pp. 443. Published by The Chemical Society, London. 10s. 6d. net.

THIS volume, like its predecessors, deals with the recent progress of chemistry in its various aspects. The individual reports are contributed by men eminent in their respective branches, and furnish a compact and valuable record of the advance of the science from year to year. General and physical chemistry is dealt with by C. N. Hinshelwood; inorganic chemistry, by H. Bassett; aliphatic organic chemistry, by E. H. Farmer; homocyclic organic chemistry, by G. M. Bennett and J. W. Baker; heterocyclic organic chemistry, by S. G. P. Plant; analytical chemistry, by J. J. Fox and B. A. Ellis; biochemistry, by A. G. Pollard and J. Pryde; crystallography, by J. D. Bernal and W. A. Wooster; colloid chemistry, by W. T. Astbury, D. C. Henry, M.A., and R. K. Schofield; and the structure of simple molecules, by N. V. Sidgwick and E. J. Bowen.

Other Books Received

BRITISH CHEMICAL ABSTRACTS ISSUED BY THE BUREAU OF CHEMICAL ABSTRACTS. Index 1931. London: The Bureau of Chemical Abstracts. Pp. 591.

ELECTRONS AND WAVES. By H. Stanley Allen. London: Macmillan and Co., Ltd. Pp. 33. 8s. 6d.

MANUAL OF INDUSTRIAL CHEMISTRY. By Allen Rogers. London: Macmillan & Co., Ltd. Pp. 1517. 2 vols. 30s. each.

MODERN METHODS IN QUANTITATIVE CHEMICAL ANALYSIS. By A. D. Mitchell and A. M. Ward. London: Longmans, Green & Co., Ltd. Pp. 178. 6s.

OIL AND PETROLEUM YEAR BOOK, 1932. By Walter E. Skinner. London: W. E. Skinner. Pp. 442. 7s. 6d.

News from the Allied Industries

Match Industry

ACCORDING TO INFORMATION RECEIVED IN NEW YORK, the Swedish Crown is to appoint a Committee of three, including one American, to take over the management of the Swedish Match Co.

Iron and Steel

EMPLOYEES at Cochrane's Ormesby Iron Works, Middlesbrought, one of the Furness group, have received intimation that they must considered themselves on day-to-day notice. This course has become necessary, it is explained, because of the economy in public works schemes and the consequent curtailment of orders for pipes, which is the chief product of these works.

IT IS RUMOURED that the Import Duties Advisory Committee has decided in favour of an import duty on pig iron, and that a recommendation to that effect will be made to the Treasury in the near future. This decision is apparently the first outcome of the detailed investigation which the Committee is making to design a more permanent iron and steel tariff than is at present in force. The Treasury Order now in operation exempts pig iron from the 33⅓ per cent. duty.

Paper Industry

THE SUBSCRIPTION LIST for an issue at par of 500,000, 6½ per cent. cumulative preference shares of £1 each of Bowater's Paper Mills, Ltd., opened on May 31, and has been heavily over-subscribed. This issue will raise the issued capital of the company to £1,220,000, there being already £300,000 in 7½ per cent. cumulative participating preference shares and £420,000 in ordinary shares. The company is one of the principal manufacturers of newsprint paper in Great Britain, together with its associated companies, W. V. Bowater and Sons, Ltd., and Bowater's Mersey Paper Mills, Ltd. Its mills at Northfleet, Gravesend, are described as among the largest and best equipped in Europe. For the year to September 30 last the mills operated to the extent of 72 per cent. of capacity. Orders on hand for the present year are sufficient to maintain them in operation at not less than 90 per cent. For the past three years dividends of 7½ per cent. have been paid on the ordinary shares.

Pottery Trades

THE POTTERY (SILICOSIS) REGULATIONS, 1932, have been made by the Home Secretary, and will come into force on July 1. These regulations, which come under Section 79 of the Factory and Workshop Act, 1901, apply to the manufacture or decoration of pottery or any incidental process, including the grinding of flint for use in the manufacture of pottery. The regulations are in accordance with the revised draft issued on April 8.

PRINCE GEORGE was the guest of the Pottery and Glass Trades' Benevolent Institutions at the jubilee dinner in London on May 31, and in proposing the toast of "Success and prosperity to the Institutions," referred to his tour of the Potteries last year, during which he gained first-hand knowledge of the intricacies of the creation of pottery. "Your industries, both pottery and glassware, have fine traditions behind them," he said. "Generations of potters and glassmakers have brought them to that high state of perfection that we know to-day. There is quality in your materials and in your ware, made by men who have been born and brought up in the trade. These highly-skilled workers are guided and controlled by men who also have inherited the same tradition, and there is not another industry to-day in which the heads of firms know their products so intimately as those who control the destinies of our potteries and glassworks. They are backed by scientific knowledge, symbolised in the pottery industry by the Ceramic Society and the Pottery Technical School and in the glass industry by the Society of Glass Technology. These technical institutions are looked on as paramount in the science of pottery and glassware, and are recognised by the entire world as such." Referring to the work of the Institution, Mr. Greenwood said that in the last financial year they had distributed a larger amount in pensions and relief than in any previous year.

Firework Trade

THREE PERSONS RECEIVED BURNS in a fire at the premises of W. and J. Wilder, fireworks manufacturers, of Warwick Road, Greet, on May 27. The fire broke out while they were filling rockets in a small shed, and the structure was burned out. The injured were Sidney Martin (28), Elizabeth Preese (38), and Ada Moyle (18). The shed was one of a large number isolated from one another, and the injured persons were the only workers in the building.

Rubber

THE PRESENT CONDITION OF THE RUBBER INDUSTRY, with all its unpleasant concomitants, should beget much criticism, said Mr. J. G. Hay, presiding at this week's meeting of the United Sua Betong Rubber Estates, Ltd. The too rapid and too extensive expansion of the area under rubber was due in the first place to abnormally large profits begotten of fortuitous circumstances, and subsequently to the maintenance of high prices by the adoption of faulty expedients, the first fruits of which were undoubtedly pleasant, but the ultimate consequences of which were now more apparent. Until the obstacles that hinder and impede international trade are removed there can be no hope of real prosperity to these industries which serve a world market. For that reason the rubber industry looks forward to the International and Imperial Conferences that are to be held soon, in the anxious hope that their outcome may be such as to indicate that the world is at last regaining its political sanity and its economic health.

Artificial Silk

THE BRITISH OUTPUT OF RAYON yarn and waste in April was 6,450,000 lb., against 6,320,000 lb. in March and a monthly average of 4,550,000 lb. last year.

IT IS UNDERSTOOD that an offer is being made to shareholders of the Branston Artificial Silk Co., Ltd., and others, of £75,000 of 6½ per cent. debenture stock at par. In a circular to the shareholders the board declares it to be "essential, if the company's valuable property is to be preserved with a view to the re-establishment of the company's activities, that the debenture stock now issued shall be fully subscribed." The Alliance Assurance Co., the mortgagees and debenture-holders, are insisting on the repayment of their loan, interest and charges. The mortgagees have informed the company through the receiver that they have received an offer of £100,000 for the freehold land, works, buildings, plant and machinery, and that it is receiving their serious consideration. The company's property stands in their books at the net figure of £871,795. It is at present insured by the mortgagees for over £600,000.

Mineral Oil

A LAST MINUTE HITCH HAS OCCURRED at the International Oil Conference, which is meeting in New York to discuss means of stabilising world oil markets. Objections have been raised in certain quarters to some of the proposed concessions to the Soviet. The conference, it is understood, has been discussing the terms of agreement whereby the European and American groups would guarantee a market during the next ten years for an annual Russian export quota of 5,300,000 tons of oil and would buy extra oil from Russia if the demand increased. It was also proposed that the Soviet should be allowed to maintain its existing distributive organisations in England, Germany and Turkey.

DURING 1930 the mineral oil industry of Trinidad suffered from the economic conditions prevailing throughout the world, and owing to over-production in the United States and other countries, the price obtainable for petroleum products in the world's markets was and is very low. It is gratifying to record that, in spite of the fact that the various operating companies in Trinidad have been suffering from the depressed financial conditions, 1930 was marked by an increase in the production of over 700,000 barrels more than that of 1929. The report of the Inspector of Mines, Trinidad, states, however, that, owing to the continued fall in prices of petroleum products, most of the companies have drastically curtailed their operations, and it does not appear probable that, until market conditions improve, there will be any marked activity in the industry.

Inventions in the Chemical Industry

Specifications Accepted and Applications for Patents

The following information is prepared from the Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given in "Specifications Accepted" are those under which the specifications are printed. Abridgments of "Complete Specifications open to Public Inspection" will not be published until they have been accepted or the applications have become void. The dates given are those claimed under the International Convention. The numbers in "Applications for Patents" are for reference in all correspondence up to the acceptance of the complete specifications. In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.

Specifications Accepted with date of Application

Cracking oils. Texas Co. Nov. 30, 1929. 373,239.

Fertiliser material, and process for the production of the same. Barrett Co. Sept. 29, 1930. 373,126.

Manufacture of anthraquinone derivatives. J. F. Thorpe and A. A. Goldberg. Feb. 9, 1931. 373,127.

Manufacture of synthetic resins. W. W. Triggs. (*Toledo Synthetic Products, Inc.*). Feb. 10, 1931. 373,184.

Manufacture and production of non-caking mixed fertilisers containing ammonium nitrate. J. Y. Johnson (*I. G. Farbenindustrie*). Feb. 11, 1931. 373,211.

Manufacture of condensation products and dyestuffs. A. Carpmael (*I. G. Farbenindustrie*). Feb. 12, 1931. 373,129.

Cotton printing by means of sulphur dyestuffs. A. Carpmael and I. G. Farbenindustrie. Feb. 12, 1931. 373,212.

Aluminium alloys. Metal Castings, Ltd., and A. H. Nicholson. Feb. 14, 1931. 373,213.

Process for transforming aliphatic hydrocarbons into higher hydrocarbons. Ruhrchemie Akt.-Ges. Feb. 14, 1930. 373,249.

Processes and apparatus for the production of chemical compounds or metals from raw materials. A. S. Burman and R. Rennerfelt. Feb. 17, 1930. 373,217.

Manufacture of basic dyestuffs. A. Carpmael (*I. G. Farbenindustrie*). Feb. 17, 1931. 373,100.

Refining of low boiling-point hydrocarbons. Silica Gel Corporation. Feb. 19, 1930. 373,174.

Process for the manufacture of vat dyestuffs of the anthraquinone series. A. Carpmael (*I. G. Farbenindustrie*). Feb. 18, 1931. 373,175.

Process of and apparatus for producing coke from carbonaceous fuels. G. Hilger. Feb. 19, 1931. 373,257.

Manufacture of easily soluble salts of acylamino-phenol-arsinic acids. I. G. Farbenindustrie. Feb. 21, 1931. 373,269.

Manufacture of non-splintering and other compound glass. F. B. Dehn (*Röhm and Haas Akt.-Ges.*). Feb. 23, 1931. 373,277.

Rubber articles and the manufacture thereof. Naugatuck Chemical Co. Mar. 8, 1930. 373,278.

Nitrogenisation of iron, steel, and alloys thereof. Electro Metallurgical Co. Feb. 26, 1930. 373,284.

Process of manufacturing iron and steel. Hirsch, Kupfer- und Messingwerke Akt.-Ges. Feb. 26, 1930. 373,295.

Processes for producing metal sponge. E. G. T. Gustafsson. Mar. 6, 1930. 373,298.

Manufacture and use of washing, cleansing, wetting-out, and emulsifying agents. Deutsche Hydrierwerke Akt.-Ges. June 18, 1930. 373,315.

Manufacture of acrylic acid. Röhm and Haas Akt.-Ges. Mar. 21, 1930. 373,326.

Catalytic destructive hydrogenation of carbonaceous materials. Chemical Reactions, Ltd. *Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler*). Apr. 10, 1931. 373,345.

Manufacture of solutions of resins. Soc. of Chemical Industry in Basle. July 11, 1930. 373358.

Manufacture of β-di (aryl-methyl)-aminoethanols. I. G. Farbenindustrie. June 10, 1930. 373,440.

Process for improving the physical properties of alloy steel containing copper. Vereinigte Stahlwerke Akt.-Ges. July 8, 1930. 373,453.

Manufacture of coumarin. Monsanto Chemical Works. Sept. 2, 1930. 373,490.

Dehydration of water-containing alkali hydroxides. H. D. Elkington. (*Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler*). Sept. 16, 1931. 373,511.

Production of artificial silk, particularly viscose silk. H. Suter. Dec. 23, 1930. 373,530.

Specifications Open to Public Inspection

Process for the production of aluminium-magnesium alloys having a high resistance to corrosion. I. G. Farbenindustrie. May 23, 1931. 31460/31.

Process for coating metal bodies with the azides of emissive metals and for the manufacture of metallic or metallic oxide cathodes. Egyesult Izzolampa es Villamossagi Reszvenytarsasag. May 22, 1931. 8492/32.

Process of treating silicon steel. American Rolling Mill Co. May 18, 1931. 11650/32.

Zinc sulphide. New Jersey Zinc Co. May 19, 1931. 11658/32.

Manufacture and use of washing, cleansing, emulsifying, dispersing, wetting-out, or like agents. Deutsche Hydrierwerke Akt.-Ges. May 18, 1931. 12888/32.

Manufacture of pyridine derivatives. J. P. Wibaut and H. J. Den Hertog, jun. May 21, 1931. 13746/32.

Process for the manufacture of condensation products. Schering-Kahlbaum Akt.-Ges. May 23, 1931. 13785/32.

Process for the manufacture of derivatives of the barbituric acid series and salts thereof. I. G. Farbenindustrie. May 16, 1931. 14040/32.

Converting hydrocarbon oils. Texaco Development Corporation. May 16, 1931. 14055/32.

Process for manufacturing mixtures enriched in oxygen from air. M. Frankl. May 16, 1931. 14069/32.

Processes for producing bituminous emulsions. M. Crowne. May 20, 1931. 14109/32.

Process for dyeing or colouring cellulose esters and cellulose ethers. Soc. of Chemical Industry in Basle. May 23, 1931. 14275/32.

Process for the partial separation of gaseous mixtures. M. Frankl. May 20, 1931. 14276/32.

Conversion of hydrocarbon oils. Texaco Development Corporation. May 19, 1931. 14285/32.

Treatment of cellulose esters for the purpose of increasing the capacity for taking up dyestuffs. I. G. Farbenindustrie. May 19, 1931. 14299/32.

Manufacture of dyestuffs of the anthraquinone series. I. G. Farbenindustrie. May 20, 1931. 14371/32.

Manufacture of magnesium. G. Gire and R. Fouquet. May 21, 1931. 14408/32.

Resinous compositions and methods of making the same. British Thomson-Houston Co., Ltd. May 21, 1931. 14402/32.

Resinous compositions. British Thomson-Houston Co., Ltd. May 21, 1931. 14403/32.

Amended Specifications Published

Manufacture of neutral polymerisation products from vinyl esters. I. G. Farbenindustrie. 336,237.

Manufacture of double salts of calcium nitrate. Lonza Elektrizitätswerke und Chemische Fabriken Akt.-Ges. 343,636.

Manufacture of amino-aryl-thiazole compounds. Carpmael (*I. G. Farbenindustrie*). 345,735.

Manufacture of anhydrides of aliphatic halogen acids. I. G. Farbenindustrie. 350,867.

Applications for Patents

Purification and decolourisation of aromatic hydroxy-carboxylic acids. S. Smith. May 17. 14047.

Process for dyeing cellulose esters, etc. Soc. of Chemical Industry in Basle. May 19. (Switzerland, May 23, '31.) 14275.

Converting hydrocarbon oils. Texaco Development Corporation. May 17. (United States, May 16, '31.) 14055.

Conversion of hydrocarbon oils. Texaco Development Corporation. May 19. (United States, May 19, '31.) 14285.

Manufacture of fertilisers. Activated Sludge, Ltd., G. Mumford and J. A. Coombs. May 23. 14634.

Zinc compounds. M. I. Aische. May 25. 14822.

Zinc and zinc compounds. M. I. Aische. May 26. 14927.

Preparation of copper sulphate from ores, etc. E. A. Ashcroft. May 27. 15118.

Chloridising and refining metals, etc. E. A. Asheroft. May 27. 15119.

Recovery of zinc, etc. salts from blast furnace slags, etc. E. A. Ashcroft. May 27. 15120.

Extraction of precious metals from ores, etc. E. A. Ashcroft. May 27. 15121.

Electrolysis of zinc, etc., chloride. E. A. Ashcroft. May 27. 15122.

Elimination of impurities from metal-bearing ores, etc. E. A. Ashcroft. May 27. 15123.

Manufacture of moulded articles. British Cyanides Co., Ltd. (Synthetic Plastics Co.). May 27. 15111.

Weekly Prices of British Chemical Products

Review of Current Market Conditions

The following notes on the chemical market conditions in Great Britain are based on direct information supplied by the British manufacturers concerned, and unless otherwise qualified the figures quoted apply to fair quantities, net and naked at makers' works. Where no locality is indicated, the prices are general for the United Kingdom. Particulars of the London chemical market are specially supplied to THE CHEMICAL AGE by R. W. Greeff and Co., Ltd., and Chas. Page and Co., Ltd., and those of the Scottish chemical market by Chas. Tennant and Co., Ltd.

CHEMICAL prices remain fairly steady in the London market and the demand had been on the whole fairly satisfactory. Coal tar products remain unchanged but firm. There is still a lack of forward buying and the only notable exceptions as regards prices have been slight reductions in lead and copper salts owing to the weak position of the metal. A shade more activity has been experienced on the Manchester chemical market this week, but this has been largely due to the fact that a week ago industrial conditions in the district had hardly got back into their stride after the Whitsun holidays. On the whole, deliveries into consumption in the cotton textile dyeing and finishing establishments are reported to be on a fair scale. General speaking, new business at the moment is of moderate dimensions, with users in few cases going much beyond early requirements. The tendency of prices in several sections is easy and in no instance have prices during the past week moved up. Little or no change has to be reported in the Scottish heavy chemical market.

General Chemicals

ACETONE.—LONDON: £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 80%, £37 5s. to £39 5s.; pure 80% £38 5s. to £40 5s.; tech., 40%, £19 15s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. SCOTLAND: Glacial 98/100%, £48 to £50; pure 80%, £38 5s.; tech. 80%, £37 5s. d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—SCOTLAND: Granulated commercial, £26 10s. per ton; B.P. crystals, £35 10s.; B.P. powder, £36 10s. in 1-cwt. bags d/d free Great Britain in one-ton lots upwards.

ACID, CHROMIC.—11d. per lb., less 2½% d/d U.K.

ACID, CITRIC.—1s. 1d. per lb. LONDON: 1s. 1d., less 5%. MANCHESTER: 1s. 1¾d.

ACID, CRESYLIC.—97/99%, 1s. 6d. to 1s. 8d. per gal.; 99/100%, 1s. 9d. to 2s.

ACID FORMIC.—LONDON: £50 per ton. *£52.

ACID, HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech.. 50% by vol., £23 10s. per ton; 50% by weight, £27 10s.; pale tech., 50% by vol., £27; 50% by weight, £32; 80% by weight, £52; edible, 50% by vol., £40. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £20 to £25 per ton makers' works, according to district and quality. SCOTLAND: 80°, £23 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 per ton in casks, £48 10s. in kegs. *£48. SCOTLAND: 98/100%, £40 to £52 ex store. MANCHESTER: £2 7s. 6d. to £2 10s. per cwt., ex store.

ACID, SULPHURIC.—Average prices f.o.r. British makers' works, with slight variations owing to local considerations: 140° Tw. crude acid, £3 per ton; 168° Tw. arsenical £5 10s.; 168° Tw. non-arsenical, £6 15s. SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. 0½d. per lb. SCOTLAND: B.P. crystals, 1s. 1¾d. to 1s. 2d. less 5% carriage paid. MANCHESTER: 1s. 0½d.

ALUM.—SCOTLAND: Lump potash, £9 per ton ex store.

ALUMINA SULPHATE.—LONDON: £8 5s. to £9 10s. per ton. *£7 10s. SCOTLAND: £8 to £8 10s. ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb. d/d, according to quantity.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £36 per ton; powdered, £38, in 5-cwt. casks d/d U.K. stations or f.o.b. U.K. ports.

AMMONIUM CHLORIDE.—£37 to £45 per ton, carriage paid. LONDON: Fine white crystals, £19 to £20. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton, carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

ANTIMONY OXIDE.—SCOTLAND: Spot £27 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden 6½d. to 1s. 1½d. per lb.; crimson, 1s. 4d. to 1s. 6d. per lb. according to quality.

ARSENIC.—LONDON: £24 10s. c.i.f. main U.K. ports for imported material; Cornish nominal, £26 10s. f.o.r. mines. SCOTLAND: White powdered £27 ex wharf; spot, £27 10s. ex store. MANCHESTER: White powdered Cornish, £27 at mines.

ARSENIC SULPHIDE.—Yellow 1s. 6d. to 1s. 8d. per lb.

BARIUM CHLORIDE.—£11 to £11 10s. per ton.

BISULPHIDE OF LIME.—£7 10s. per ton f.o.r. London, packages free.

BLEACHING POWDER.—Spot 35/37% £7 10s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 15s. in 5/6 cwt. casks.

BORAX, COMMERCIAL.—Granulated £15 10s. per ton, powder £17, packed in 1-cwt. bags, carriage paid any station Great Britain. Prices are for 1-ton lots and upwards.

CADMIUM SULPHIDE.—3s. 6d. to 3s. 9d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot £5 5s. to £5 15s. per ton d/d station in drums.

CARBON BISULPHIDE.—£30 to £32 per ton, drums extra.

CARBON BLACK.—4½d. to 5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £55 per ton, drums extra.

CHROMIUM OXIDE.—10d. to 10½d. per lb. according to quantity d/d U.K. Green 1s. 2d. per lb.

CHROMETAN.—Crystals 3¾d. per lb. Liquor £19 10s. per ton d/d.

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r., or ex works.

CREAM OF TARTAR.—LONDON: £5 2s. 6d. to £5 3s. 6d. per cwt.

FORMALDEHYDE.—LONDON: £28 to £28 10s. per ton. *£30. SCOTLAND: 40%, £28 10s. ex store.

HYDROGEN PEROXIDE.—LONDON: *100 vols. 10d. per lb.

LAMPBLACK.—£46 to £50 per ton.

LEAD, ACETATE.—LONDON: White, £39 to £41 per ton. Brown £1 per ton less. *£40 and £39 respectively ex wharf London. SCOTLAND: White Crystals £42 to £44 c.i.f. U.K. ports. Brown £1 per ton less. MANCHESTER: White, £35 10s.; Brown, £34.

LEAD, NITRATE.—£28 10s. per ton.

LEAD, RED.—SCOTLAND: £28 10s. per ton d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £40 per ton carriage paid.

LITHOPONE.—30%, £20 to £22 per ton.

MAGNESITE.—SCOTLAND: Ground Calcined £9 per ton ex store.

METHYLATED SPIRIT.—61 O.P. Industrial 1s. 8d. to 2s. 3d. gal. Pyridinised Industrial, 1s. 10d. to 2s. 5d. Mineralised, 2s. 9d. to 3s. 3d. 64 O.P. 1d. extra in all cases. Prices according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 8d. to 2s. 3d.

NICKEL AMMONIUM SULPHATE.—£38 per ton d/d.

NICKEL SULPHATE.—£38 per ton d/d.

POTASH, CAUSTIC.—£30 to £33 per ton. LONDON and MANCHESTER: £42.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. net d/d U.K. Discount according to quantity. Ground 5¾d. LONDON: 5d. per lb. with usual discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports with allowance for contracts. MANCHESTER: 5d.

POTASSIUM CARBONATE.—SCOTLAND: 96/98% spot £28 per ton ex store. LONDON: £31 10s. to £32. MANCHESTER: £31 to £32.

POTASSIUM CHLORATE.—3¾d. per lb. export London in 1-cwt. kegs. LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100% powder, £34. MANCHESTER: £36.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM NITRATE.—SCOTLAND: Refined Granulated £28 per ton c.i.f U.K. ports. Spot £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8½d. to 9d. per lb. SCOTLAND: B.P. crystals, 8½d. MANCHESTER: Commercial, 8d.; B.P., 8½d.

POTASSIUM PRUSSIATE.—LONDON: 8½d. to 9d. per lb. SCOTLAND: Yellow spot material, 8½d. ex store. MANCHESTER: Yellow, 8½d.

SALAMMONIAC.—First lump spot, £42 17s. 6d. per ton d/d in barrels.

SODA ASH.—58% spot, £6 per ton f.o.r. in bags, special terms for contracts.

SODA, CAUSTIC.—Solid 76/77° spot £14 10s. per ton d/d station. SCOTLAND: Powdered 98/99% £17 10s. in drums, £18 15s. in casks. Solid 76/77%, £14 10s. in drums. 70/72% £14 12s. 6d. carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £12 15s. to £14 contracts.

SODA CRYSTALS.—Spot £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£21 to £22 per ton.

SODIUM BICARBONATE.—Refined spot £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 10s. ex quay or station. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous 5d. per lb. LONDON: 4d. per lb. with discounts for quantities. SCOTLAND: 4d. delivered buyer's premises with concession for contracts. MANCHESTER: 4d. less 1 to 3½% contracts, 4d. spot lots.

SODIUM BISULPHITE POWDER.—60/62%, £16 10s. per ton d/d 1-cwt. iron drums for home trade.

* Prices quoted by other manufacturers.

SODIUM CARBONATE (SODA CRYSTALS).—SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality 7s. 6d. per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.
SODIUM CHLORATE.—2¾d. per lb. LONDON: £29 per ton. *£32 10s. MANCHESTER: £29.
SODIUM CHROMATE.—3⅝d. per lb. d/d U.K.
SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals £15 ex station 4-ton lots. MANCHESTER: Commercial, £9 5s.; photographic, £15.
SODIUM NITRITE.—Spot £19 to £22 per ton d/d station in drums.
SODIUM PERBORATE.—LONDON: 10d. per lb.
SODIUM PHOSPHATE.—£13 to £15 per ton f.o.r. London casks free. LONDON: Dibasic, £13 per ton. MANCHESTER: £13 to £13 10s.
SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 5d. to 6d.
SODIUM SILICATE.—140° Tw. Spot £8 5s. per ton d/d station returnable drums.
SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d. SCOTLAND: English material £3 15s.
SODIUM SULPHATE (SALT CAKE).—Unground Spot £3 15s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 2s. 6d.
SODIUM SULPHIDE.—Solid 60/62% Spot £10 15s. per ton d/d in drums. Crystals Spot £7 15s. per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 2s. 6d. d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11 5s.; commercial, £8.
SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot £9 10s. d/d station in bags.
SULPHATE OF SOPPER.—MANCHESTER: £17 to £18 per ton f.o.b.
SULPHUR.—£12 5s. to £15 15s. per ton. SCOTLAND: Flowers, £12 10s.; roll, £12; rock, £9. Ground American, £12 ex store.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.
SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. Commercial, £50 to £55.
VERMILION.—Pale or deep, 6s. 4d. per lb.
ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.
ZINC SULPHATE.—LONDON and SCOTLAND: £12 per ton.
ZINC SULPHIDE.—1s. to 1s. 2d. per lb.

Pharmaceutical and Fine Chemicals

THE following changes in price are reported:—
CAMPHOR.—Refined flowers, 3s. 1d. to 3s. 3d. per lb.; transparent tablets, 3s. 4d. to 3s. 6d. per lb.
MENTHOL, A.B.R., RECRYST. B.P.—15s. per lb.
MERCURIALS, B.P.—Red oxide crystals, 6s. 4d. to 6s. 5d. per lb.; Levig, 5s. 10d. to 5s. 11d. per lb.; corrosive sublimate, lump, 4s. 5d. to 4s. 6d. per lb., powder, 4s. 1d. to 4s. 2d. per lb.; white, precip., lump, 5s. 1d. to 5s. 2d. per lb., powder, 5s. 3d. to 5s. 4d. per lb.; calomel, 5s. 2d. to 5s. 3d. per lb.; yellow oxide, 5s. 8d. to 5s. 9d. per lb.; persulph., B.P.C., 5s. 4d. to 5s. 5d. per lb.; Sulph, nig., 5s. 1d. to 5s. 2d. per lb.
LINALOL.—Ex Bois de Rose, 6s. per lb.
RHODINOL.—58s. per lb.

Essential Oils

CITRONELLA, JAVA.—2s. 8d. per lb.
LEMON.—7s. per lb.
ORANGE, SWEET.—8s. 3d. per lb.
PEPPERMINT, JAPANESE.—4s. 6d. per lb.

Coal Tar Products

ACID, CARBOLIC (CRYSTALS).—5½d. to 6¾d. per lb. Crude, 60's 1s. 5¼d. to 1s. 6¼d. per gal. SCOTLAND: Sixties, 1s. 7d. to 1s. 8d.
ACID, CRESYLIC.—99/100, 1s. 7d. per gal.; B.P., 2s. to 2s. 2d.; Refined, 1s. 9d. to 1s. 11d.; Pale, 98%, 1s. 6d. to 1s. 7d.; Dark, 1s. 4d. to 1s. 4½d. LONDON: 98/100%, 1s. 6d. *Dark 95/97%, 1s. 4d. SCOTLAND: Pale 99/100%, 1s. 3½d. to 1s. 4½d.; 97/99%, 1s. 1½d. to 1s. 2½d.; dark 97/99%, 1s. 0½d. to 1s. 1½d.; high boiling acid, 2s. 6d. to 3s.
BENZOL.—At works, crude 7d. to 7½d. per gal. Standard motor, 1s. 2d. to 1s. 3d.; 90%, 1s. 3d. to 1s. 4d. Pure, 1s. 6d. to 1s. 7d. LONDON: Motor, 1s. 5½d. SCOTLAND: Motor, 1s. 3½d. to 1s. 4½d.; 90%, 1s. 9½d. to 1s. 10½d.
CREOSOTE.—Standard for export, 4¾d. to 5d. nett per gal. f.o.b. for Home, 3¾d. d/d. LONDON: 3d. to 3½d. f.o.r. North; 4d. to 4¾d. London. MANCHESTER: 3¾d. to 4¾d. SCOTLAND: Specification oils, 3¾d. to 4¼d.; washed oil, 4d. to 4½d.; light, 3¾d. to 4¼d.; heavy, 4¼d. to 5d.
NAPHTHA.—Solvent, 90/160, 1s. 4d. to 1s. 5d. per gal.; 95/160, 1s. 4½d.; 90/190, 1s. 1d. to 1s. 2d. LONDON: Solvent, 1s. 1¼d. to 1s. 2d.; heavy, 11d. to 1s. 0¼d. f.o.r. SCOTLAND: 90/160, 1s. 3d. to 1s. 3½d.; 90/190, 1s. 1d. to 1s. 2d.
NAPHTHALENE.—Purified crystals, £9 10s. per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 65s. to 70s.
PYRIDINE.—90/140, 3s. 9d. per gal.; 90/160, 4s. to 4s. 6d.; 90/180, 2s. to 2s. 6d. SCOTLAND: 90/160%, 4s. to 5s.; 90/220%, 3s. to 4s.
REFINED COAL TAR.—SCOTLAND: 5d. to 5¼d. per gal.
TOLUOL.—90%, 2s. 2d. per gal.; Pure, 2s. 7d.
XYLOL.—1s. 9d. per gal.; Pure, 1s. 11d.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 per ton. Grey, £12. Liquor, 8d. to 9d. per gal. MANCHESTER: Brown, £7 5s.; grey, £11.
ACETIC ACID, TECHNICAL, 40%.—£16 15s. to £18 per ton.
ACETONE.—£63 to £65 per ton.
AMYL ACETATE, TECHNICAL.—95s. to 110s. per cwt.
CHARCOAL.—£7 10s. to £12 per ton.
IRON LIQUOR.—24°/30° Tw., 10d. to 1s. 2d. per gal.
WOOD CREOSOTE.—1s. to 2s. 6d. per gal., unrefined.
WOOD NAPHTHA, MISCIBLE.—3s. to 4s. per gal. Solvent, 3s. 9d. to 4s. 9d. per gal.
WOOD TAR.—£2 to £6 per ton.
BROWN SUGAR OF LEAD.—£32 per ton.

Latest Oil Prices

LONDON, June 1.—LINSEED OIL was inactive. Spot, small quantities, £16; June, £12 17s. 6d.; July-Aug. £13 7s. 6d.; Sept.-Dec., £13 17s. 6d.; Jan.-April, £14 15s. per ton, naked. RAPE OIL was quiet. Crude extracted, £28 10s.; technical refined, £30 10s. per ton, naked, ex wharf. COTTON OIL was quieter. Egyptian crude, £20 10s.; refined common edible, £22 10s.; deodorised, £24 10s. per ton, naked, ex mill. TURPENTINE was quiet. American, spot, and July, 59s. per cwt., sellers.

HULL.—LINSEED OIL.—Spot closed at £13 2s. 6d.; May, £12 12s. 6d.; June, £12 15s.; July-Aug. £12 17s. 6d.; Sept.-Dec., £13 10s.; Jan.-April, £14 5s. per ton. COTTON OIL.—Egyptian crude, spot, £20 5s.; edible refined, spot, £22 10s.; technical, spot, £22 10s.; deadorised, £24 5s. per ton, naked. PALM KERNE OLL.—Crude, f.m.q., spot, £21 per ton, naked. GROUNDNUT OIL.—Crushed-extracted, spot, £31; deodorised, £35 per ton. SOYA OIL.—Crushed-extracted, spot, £20; deodorised, £23. RAPE OIL.—Crushed-extracted, spot, £27 10s.; refined, £29 per ton. COD OIL, 10s. 6d. per cwt. CASTOR OIL.—Pharmacy, spot, 41s. 6d.; first, 36s. 6d.; second, 31s. 6d. per cwt. TURPENTINE.—American, spot, 60s. per cwt.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—The consuming season in Northern Europe is practically over and buyers are awaiting some announcement of prices before considering purchases for forward positions. The market for prompt shipment is quiet at about £4 7s. 6d. per ton f.o.b. U.K. port in single bags. *Home.*—Sales in the South of England have been reported at £5 10s. per ton delivered in 6-ton lots to consumers' nearest station, but the quantities changing hands have been very small. There is little more interest in the North and Scotland and prices are a little higher.

NITRATE OF SODA.—The imported product is still offered at £9 per ton delivered in 6-ton lots to consumers' nearest station. Only small sales are being made. The price of the British product remains unchanged at £8 16s. per ton. The amount of business reported has been small.

NITRO-CHALK.—A fair demand is still reported. The price remains unchanged at £7 5s. per ton delivered in 6-ton lots.

Tariff Changes

POLAND.—A Decree, dated March 12, which becomes effective as from July 12 next, lays down a system of control for the sale of artificial fertilisers in Poland. For the purposes of the Decree artificial fertilisers are defined as being all products of industrial or mineral origin intended for the fertilisation of the soil and containing at least one of the elements nitrogen, phosphorus, potassium or calcium. It is stipulated that each delivery of artificial fertiliser to a purchaser shall be accompanied by a written statement on the part of the vendor giving the words "artificial fertiliser"; the name of the artificial fertiliser in question; a specification of the essential useful ingredient or ingredients; full name and address of the vendor; and date of delivery. In the case of imported fertilisers the invoice, bill of lading and other usual trade documents will be accepted as equivalent to the written statement provided they contain the information set out above. If the artificial fertiliser is sold packed the packing must bear in legible characters the words "artificial fertiliser," the names of the fertiliser and of the concern producing it, and, in the case of imported fertilisers, the name of the Country of origin. Persons interested in this matter may consult a translation of the Decree at the Department of Overseas Trade, 35 Old Queen Street, London, S.W.1.

* Prices quoted by other manufacturers.

Memoranda for the Food Industries

A New Annual Publication

A NEW compendium under the title of "Food Industries Manual" has been published by Leonard Hill, Ltd., 231 Strand, W.C.2, with the object of providing in readily accessible form the chief technical and commercial data relating to the manufacture, preserving, packing and storage of food products. In doing this it supplies a want which has long been felt and expressed by manufacturers and others connected with the food industry, since published information of a practical and up-to-date character is incomplete, widely scattered, and often difficult of access. The subject-matter has been contributed by well-known technical experts with works experience, and it has been grouped into sections embracing the milling and baking industries, sugar confectionery, chocolate, jam and jelly manufacture, canning, meat products, packing, food storage and refrigeration, composition of foods and financial statistics. There is also an extensive bibliography, and lists of firms, products, plant, and trade names. Every effort has been made to arrange this great variety of material in such a way as to enable the inquirer to find what information he wants in the shortest time, and with the least trouble, efforts have also been made to ensure the accuracy of the data given. The volume is to be published annually, thus enabling it to keep abreast of new development and to record the latest information on all topics covered by the industry. The value of the information given in the editorial sections has been considerably increased by particulars of plant and equipment furnished by the manufacturers themselves. The volume is edited by H. B. Cronshaw, with the assistance of F. Hirst and W. B. Adam (both of the Fruit and Vegetable Research Station, Bristol University), T. H. Fairbrother, A Samson and S. H. Withey.

Sugar in the British West Indies

The Chadbourne Plan

MR. J. L. Wilson Goode, the British Trade Comissioner at Trinidad, states in his report on "Economic Conditions in the British West Indies," published for the Department of Oversease Trade by H.M. Stationery Office (3s. net) that the present deplorable condition of the sugar industry is attributed mainly to the extension of the sugar plantations of Cuba beyond the limit of actual requirements. Cuban planters and their New York bankers were apparently misled by the excessive profits made during the war and the early post-war years and the policy of expansion which in face of severe losses was adopted in Cuba, the largest producing country, has reacted hardly on other sugar-producing countries. Now, however, a change of policy has taken place.

A committee under the chairmanship of Mr. Thomas Chadbourne has been formed, and a five-year plan known as the Chadbourne Plan has been evolved. The object of this plan is to induce the Continental beet sugar producers and the Java cane sugar producers to unite with producers in Cuba with a view to removing the pressure of surplus stocks from the market and to ending over-production. Although the plan has not increased the value of sugar to any appreciable extent, it has arrested the decline in prices, and the success already achieved, which has far exceeded the expectation of the first year, points to the conclusion that the plan is based on a solid foundation. Cuba has withdrawn from the market 1,300,000 tons of sugar which has been stored, and will be released at the rate of one-fifth part yearly for five years, the Cuban Government having arranged for advances in the interval to the owners of the sugar. Java has similarly segregated 650,000 tons, and the Continental beet countries, apart from Russia, are all segregating their surplus. The steps taken for checking over-production have already brought about drastic reductions in crops. Cuba has during 1931 made 1,500,000 tons less than during 1930, and the Continental beet crop now being made, is estimated at 2,500,000 tons less than during 1930.

Java is to adjust her production to requirements so as to prevent any accumulation of stocks. As a result, world production has been brought well below consumption. The world production, excluding Russia, is estimated at 23,800,000 tons, and the consumption at approximately 25,600,000 tons.

Building Industry Test Work

A Panel of Laboratories

IN recent years there has been a growing demand on the Building Research Station of the Department of Scientific and Industrial Research for tests and reports on building materials and forms of construction. In order to enable the station to cope with these requests, a panel of approved testing laboratories is being established to act in association with the station. The essence of the scheme is to put the station in the position to have tests carried out at laboratories on the panel and then to incorporate the results in Government reports or certificates issued by the station. The bulk of the tests will probably be mechanical or physical; of the chemical tests most will probably be simple analyses.

Applications are invited from testing laboratories wishing to participate in the scheme. Further particulars and forms of application can be obtained from the Director, Building Research Station, Garston, Herts.

Gluconic Acid Manufacture

A New Process Developed in the United States

GLUCONIC acid and its derivatives were exhibited for the first time as items of commercial importance at the Chemical Exposition held in New York, in May, 1931, and at that time we were given some insight into the remarkable properties of gluconic lactone as a constituent of baking powder. This material exhibits its acid properties in a dough only when the dough is heated in the oven. The commercial product was prepared by a fermentation process, but more recently ("Industrial Engineering Chemistry," April, 1932) H. S. Isbell, H. L. Frush and F. J. Bates, of the United States Bureau of Standards, have devised a process of manufacture by electrochemical oxidation which yields calcium gluconate, a material from which other derivatives may be prepared and which has certain values in medicine. In a previous paper "Bureau of Standards Journal of Research," 1931, *6*, 1145) the authors described a simple method for the preparation of the calcium salts of the aldonic acids by electrolytic oxidation of the aldose sugars in the presence of a bromine and calcium carbonate. This method has been applied on a larger scale and has proved to be very satisfactory for the manufacture of calcium gluconate in considerable quantity. The principal products of the reaction are calcium gluconate, carbon dioxide, and hydrogen.

The Rare Earth Elements

A Physico-Chemical Study

A RECENT issue of "Czechoslovak Chemical Communications" contained a lengthy paper by Professor B. Brauner and Dr. E. Svagr on the sulphates of the rare earth metals, scandium, yttrium, lanthanum, praseodymium, neodymium, samarium, gadolinium, terbium, erbium, ytterbium and thorium. The salts were prepared from the purest materials available and most of them have been used for atomic weight determinations by conversion into the metal oxide through ignition. The results are compared with those of Hönigschmid, Sterba-Böhm, Baxter, Urbain and other investigators, and the possible sources of error are discussed. The conclusion is reached that the classical sulphate method, which serves well for orientation in the fractionation of rare earth mixtures, is not exact enough for atomic weight determinations. One source of error which has probably not hitherto been taken into account is that the oxides, after glowing and cooling, absorb oxygen from the air and thus become heavier and give a figure for the atomic weight which is too high. Among the physico-chemical investigations carried out by the authors were determination of the conductivities of the aqueous solutions of the normal and acid sulphates. Estimations of basicity were studied by the inversion of cane sugar and by the rates of hydrolysis of methyl acetate. Thorium sulphate, $Th(SO_4)_2$, $9H_2O$, and the acid salt, $Th(SO_4) . (SO_4H)_2$, the only thorium hydrogen sulphate obtained in the researches, showed anomalous behaviour compared with the other earth sulphates; this the authors attribute to the tetravalence of thorium.

From Week to Week

PROFESSOR F. J. WILSON, of the Royal Technical College, Glasgow, is chairman-elect of the Glasgow and West of Scotland Section of the Society of Chemical Industry.

AN EXTRAORDINARY MEETING of Leicestershire (L. and N.) Coal Distillation, Ltd., is to be held on June 16 to consider a resolution that the company's name be changed to British Coal Distillation, Ltd.

PAPERS SUBMITTED FOR DISCUSSION at the annual congress of the Institute of Transport held at Buxton this week, included "Scientific Research on the L.M.S. Railway," by Sir Harold Hartley, and "Fuel Research in relation to Transport" by Professor R. V. Wheeler.

SIR MAX MUSPRATT, of Imperial Chemical Industries, Ltd., will take the chair at the Manufacturers' Session at the eighth annual convention of the Advertising Association to be held at Liverpool, June 11-15. Other speakers will include Sir John Sandeman Allen, M.P., Sir Edwin Stockton, and Major Colville, M.P., Secretary of the Department of Overseas Trade.

THE IMPORT DUTIES ADVISORY COMMITTEE gives notice of the application by Transparent Paper, Ltd., for the imposition of increased duties in respect of transparent wrapping of the "cellophane" type. Any representations which interested parties desire to make in regard to this commodity should be addressed in writing to the Secretary, Import Duties Advisory Committee, Caxton House (West Block), Tothill Street, London, S.W.1., not later than June 20.

SIR ARTHUR MCDOUGALL DUCKHAM, G.B.E., K.C.B., of High Warren, Ashtead, Surrey, formerly of Walden, Little Bookham, Surrey, who died suddenly on February 14, left £78,448 gross, with £28,674 net personalty. Sir Arthur was chairman of Woodall-Duckham (1920) Ltd.; Woodall-Duckham Vertical Retort and Oven Construction Co. (1920) Ltd.; British Furnaces, Ltd.; Peco, Ltd.; Stourbridge Refractories Co., Ltd.; and Thermal Industrial and Chemical (T.I.C.) Research C., Ltd.; president-elect of the Federation of British Industries; and one time president of the Society of British Gas Industries.

ARRANGEMENTS HAVE BEEN COMPLETED for a delegation representative of the British cotton industry to proceed to Canada to meet the heads of the principal cotton manufacturing concerns in the Dominion for a discussion of tariff preferences and all other issues of economic co-operation which are to be raised at the Ottawa Conference. The list of delegates includes, amongst others, Mr. John Grey, chairman of the Cotton Spinners' and Manufacturers' Association; Mr. C. C. Railton, director of the Calico Printers' Association; Mr. T. Whitworth, representing the Allied Association of Bleachers, Dyers, Printers and Finishers; and Mr. E. Raymond Streat, secretary of the Manchester Chamber of Commerce.

A SERIES OF EIGHT LECTURES and demonstrations on tropical hygiene, for men and women outside the medical profession proceeding to the tropics, will be given under the auspices of the London School of Hygiene and Tropical Medicine (University of London), by Lieut.-Colonel G. E. F. Stammers from June 14 to 23. These courses of instruction, in addition to providing simple rules for guidance in regard to personal hygiene and preparation for life in the Tropics, will also embrace a short account of some of the more common diseases, with advice in regard to measures of protection and self-treatment. The synopsis and other particulars can be obtained from the Secretary, London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C.1.

A VERDICT OF ACCIDENTAL DEATH was returned at an inquest at Stockton on Charles Robert Gray (29), Thornaby, who died in the Stockton and Thornaby Hospital from injuries received at the works of the Imperial Chemical Industries (Fertilisers and Synthetic Products, Ltd.), Billingham. Mr. Robert Johnson, group engineer, told the coroner how deceased had been called from his ordinary job of controlling a raw meal feed into a kiln, to assist five more men on a winch, who were attempting to pull a scraper-rod, which appeared to have seized, out of a gas pipe, and that when the six men attempted to turn the winch part of the overhead tackle broke away and struck the man in the back. It was stated in the medical evidence that the man was in such a critical condition when admitted that a detailed examination of his injuries was impossible.

ON THE OCCASION of the annual general meeting of the British Standards Institution, which is to be held on June 9, a luncheon has been organised, at which the President of the Board of Trade, Mr. Walter Runciman, the High Commissioners for Canada, Australia, India, Newfoundland, and the Irish Free State, and a number of other distinguished guests, will be present. Mr. C. le Maistre, the Director of the Institution, who has been making a tour of the Dominions at the instigation of the Board of Trade for the purpose of developing co-operation between the standardising bodies in the various dominions with a view to the Empire unification of specifications, etc., will reach England on June 6, and the luncheon will provide a suitable opportunity for welcoming him back after a seven months' tour.

THE BROMBOROUGH MARGARINE WORKS, at Wirral, which are owned by Unilever, Ltd., have now been in operation for several weeks and production amounts to about 1,000 tons per week.

MANDLEBERG AND CO., of Pendleton, Manchester, manufacturers of waterproofs, has purchased a factory in Dublin, and machinery is on its way from England. The company hopes to start operations with 100 employees.

DR. R. LESSING announces that he has moved his laboratory and that his consulting practice is now being carried on at 50 Queen Anne's Gate, Westminster, S.W.1 His telegraphic address is "Pyrophoric, Parl, London," and his telephone number remains Victoria 6172.

IT IS UNDERSTOOD that Monel-Weir, Ltd., are closing down their Glasgow works and transferring their interests to an establishment south of the Border, probably Birmingham. This company, which is a subsidiary of G. and J. Weir, Ltd., Cathcart, are concessionaires for monel metal which possesses remarkable properties of corrosion resistance.

THE "Oil and Petroleum Year Book for 1932" is now available. This work, which is invaluable as a reference book for all interested in oil companies and in the petroleum industry, is now in its twenty-third year. While all the main features have been retained, some useful additions have been made this year. A number of additional foreign oil companies have been included, several of which have connections with Great Britain. The book is published by Walter E. Skinner, 15 Dowgate Hill, E.C.4.

WRITING A MESSAGE OF GOOD WISHES to the Advertising Association with reference to its forthcoming eighth annual convention at Liverpool, from June 11 to 15, Sir Harry McGowan, chairman of Imperial Chemical Industries, says: "If we, as an industrial nation, have had a fault in the past, it has surely been that we have underestimated the importance of publicity. We can say with justifiable pride that no country is ahead of us either in research or in production. It is in the marketing of our products that we have perhaps been laggards."

A SPECIAL COMMISSION to investigate conditions in the Gaeltacht (Irish-speaking district on the western coast of Ireland) has been set up by the Irish Free State Government. The full terms of reference of the commission have not yet been declared, but it is understood that in addition to the technical examination of the kelp and carrageen industry an investigation of the primitive dyes used for the dyeing of homespun tweeds will be made. The western Irish people have achieved considerable success with their dyeing of tweeds, which always retain their colour.

A REPRESENTATION has been made to the Board of Trade under Section 10 (5) of the Finance Act, 1926, for the exemption of methylcyclohexanol adipate from the duty imposed by Section 1 of the Safeguarding of Industries Act, 1921, as amended by the 1926 Act, on the ground that it is not made in any part of the Dominions in substantial quantities having regard to the consumption for the time being in the United Kingdom, and that there is no reasonable probability that it will within a reasonable period be made in the dominions in such substantial quantities. Any communication should be addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, S.W.1, not later than June 30.

THE FOLLOWING APPOINTMENTS have been made by the Senate of the University of London:—Chair of Inorganic Chemistry (Imperial College-Royal College of Science), from October 1, 1932.—Professor H. V. A. Briscoe, D.Sc. (London), since 1921 Professor of Inorganic and Physical Chemistry at Armstrong College, Newcastle-on-Tyne, and Director of the Department of Chemistry since 1925. Readership in Chemical Engineering (Imperial College-Royal College of Science3, from October 1, 1932.—Mr. S. G. M. Ure, M.A., B.Sc., since 1921 Lecturer in Chemical Engineering at the Imperial College. The title of Professor of Physical Chemistry in the University was conferred on Dr. Samuel Sugden, D.Sc. (London) in respect of the post held by him at Birkbeck College.

Obituary

LEONARD NORMAN BARROW, a director of the Staveley Coal and Iron Co., and of the Yorkshire Main Colliery Co. (1923), in a nursing home at Nottingham. His great-uncle owned the Staveley Works until 1863, when the Staveley Co. was formed.

EDWIN J. SHAW, of the Elms, Comberbach, a prominent official of Imperial Chemical Industries, who had risen from a junior position to a managerial position at Brunner, Mond and Co.'s works. Aged 61. Mr. Shaw was president of the Imperial Chemical Industries Flower Show.

FRANCIS TREHERNE THOMAS, at Beaulieu-sur-Mer, France, aged 66. Mr. Thomas succeeded his father as chairman and managing director of the great Welsh tinplate and steel enterprise, Richard Thomas and Co., Ltd., in 1917. Ill-health forced his resignation and retirement to a warmer climate in 1926.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]

ALEXANDER (W. T.) AND SONS, LTD., Manchester, varnish manufacturers. (M., 4/6/32.) Registered May 20, mortgage to Midland Bank, Ltd., securing all moneys due or to become due to the Bank; charged on property in Chase Street, Manchester, etc.

ALLENS (LIVERPOOL), LTD., soap manufacturers. (M., 4/6/32.) Registered May 24, £600 debentures to H. Coxon, Gaw Hill Lane, Aughton, and another; general charge. *Nil. Jan. 11, 1932.

BAIRD AND TATLOCK (LONDON), LTD., laboratory furnishers. (M., 4/6/32.) Registered May 24, series of £40,000 debentures, present issue £11,800; general charge. *£10,800. Aug. 6, 1021.

CHESHIRE UNITED SALT CO., LTD., London, E.C. (M., 4/6/32.) Registered May 20, £3,500 debentures, part of amount already registered;; general charge. *£9,025. Oct. 23, 1931.

ILLINGWORTH CARBONISATION CO., LTD., Manchester. (M., 4/6/32.) Registered May 17, £6,200, £1,000 and £2,500 debentures, part of £50,000 (not ex.); general charge. *Nil. Jan. 2, 1931.

LEVER BROTHERS, LTD., Port Sunlight, soap manufacturers. (M., 4/6/32.) Registered May 4, Trust Deed dated April 29, 1932, securing £3,440,000 and any further stock not ex. £15,000,000 at any one time, inclusive of 1st debenture stock outstanding under Trust Deed of April 11, 1921, present issue £3,440,000; general charge. *£13,996,158. May 13, 1931.

NOR-RUST LIQUID LEAD CO., LTD., London, S.W. (M., 4/6/32.) Registered May 20, £3,000 debenture, to Branch Nominees Ltd., 15 Bishopsgate, E.C.; general charge. *——. July 1, 1931.

PHARMACEUTICAL CORPORATION, LTD., London, E.C. (M., 4/6/32.) Registered May 18, series of £10,000 debentures, present issue £5,000; general charge.

TARFROID (1931) LTD., London, E.C., road material manufacturers. (M., 4/6/32.) Registered May 20, £1,386 and any further moneys charge, to Oceana Developments Co., Ltd., 3 London Wall Buildings, E.C.; charged on moneys payable under certain contracts.

Satisfaction

BAIRD AND TATLOCK (LONDON), LTD., laboratory furnishers. (M.S., 4/6/32.) Satisfaction registered May 18, of debentures registered August 12 and September 4, 1903, and August 25, 1925, to extent of £10,800.

Chemical Trade Inquiries

Abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

EGYPT.—A firm established at Alexandria desires to obtain the representation of United Kingdom manufacturers of chemicals for tanners. (Ref. No. 957.)

CYPRUS.—A Nicosia agent and merchant desires to represent United Kingdom sugar exporters. (Ref. No. 947.)

BELGIUM.—A firm of chemical merchants established at Brussels wishes to obtain the representation of United Kingdom manufacturers of chemical products for the textile and tanning industries, such as blood albumen, aluminium hydroxide, talcum, glauber salt, chrome, alum, etc. (Ref. No. 950.)

Other Inquiries

The following inquiries have also been received. Except where otherwise stated information should be sent to the Editor of THE CHEMICAL AGE.

CAPSULING MACHINES.—A firm of chemical manufacturers wishes to obtain the names and addresses of makers of capsuling machines.

METABISULPHITE.—A firm of wholesale druggists desires to find the manufacturers of "Pinnacle" brand potassium metabisulphite.

SWEDEN.—Swedish firms desire to act as agents for, or to get into touch with, English suppliers of surgical rubber and asbestos goods, lithopone, etc. Apply to the Swedish Chamber of Commerce, 14 Trinity Square, London, E.C.3.

UNITED STATES.—A formula is required for making floor wax, particularly a liquid water wax, which does not contain any ingredients injurious to rubber or asphalt flooring.

Company News

RECKITT AND SONS, LTD.—A quarterly interim dividend of 5 per cent. (1s. per share), the same as last year, will be paid on July 1 on the ordinary shares.

MAGADI SODA CO., LTD.—The accounts for the year 1931 show a trading loss of £2,858, while the total loss is £42,213, raising the debit balance to £51,700.

FULLERS EARTH UNION.—A dividend on the ordinary shares is announced at the rate of 8 per cent. per annum, and on preferred ordinary shares of 11 per cent., less tax, both payable on May 31.

WIGGINS TEAPE AND ALEX. PIRIE.—The balance of profits for 1931 amounts to £41,003 against £35,000 in the previous year, to which is added £1,600 brought forward, making £42,603. The preference dividend requires £21,000, and dividend of 10 per cent., less tax (7 per cent.), on ordinary £20,000, leaving to be carried forward £1,603.

THOS. FIRTH AND JOHN BROWN, LTD.—A balance of £14,687 is shown on trading account, including investment income, and after adjustment of stock values, in the report for 1931. After charging directors' fees, debenture and other interest, but taking £5,000 from income-tax reserve, there is a debit balance for the year of £44,669, which, credited with £75,983 brought forward, leaves a credit balance of £31,314 to be carried forward. Last year, after making all payments and placing £15,000 to reserve for contingencies, there was a balance of £10,902.

B. LAPORTE, LTD.—The profit for the year ended March 31, including dividends and interest received from investments, after charging directors' fees, making adequate provision for depreciation and doubtful debts, and providing a special sum for obsolescence, amounts to £37,278. The directors propose to pay a dividend on the ordinary shares at the rate of 10 per cent. for the year ended March 31; to place to directors' special remuneration £800; to transfer to reserve fund, £2,000; to transfer to investments reserve account £2,500; to write off patents account £1,000; to transfer to income tax suspense account £4,000. Accrued preference dividends to March 31, 1932, absorb £2,809, leaving £12,655 to be carried forward.

W. J. BUSH AND CO.—The accounts for the year 1931 show a gross profit of £201,338 against £220,435 last year. After providing for debenture interest, expenses and directors' remuneration, and making allowances for depreciation, there is a net profit shown of £30,313. Adding £79,820 brought forward, also £1,869 being provision for liabilities released less amount required for dividends on preference shares and deducting £2,328 provision for tax and £6,550 transfer to exchange reserve, there remains £96,873. The directors recommend a final dividend of 3½ per cent. on the ordinary shares, making 6 per cent. for the year, carrying forward £81,873. The annual meeting will be held at the Great Eastern Hotel, Bishopsgate, London, on June 8, at 11 a.m.

New Chemical Trade Marks

Compiled from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52 Chancery Lane, London, W.C.2.

Opposition to the registration of the following trade marks can be lodged up to June 11, 1932.

Viver. 530,342. Class 3. Chemical substances prepared for use in medicine and pharmacy, but not including cod liver oil and cod liver oil compounds and not including any goods of a like kind to any of these excluded goods. J. N. Nichols and Co., Ltd., Britannic Works, Ayres Road, Brook's Bar, Manchester. March 18, 1932.

Primolax. 530,700. Class 3. Chemical substances prepared for use in medicine and pharmacy, but not including soap. H. R. Napp, Ltd., 3 and 4 Clement's Inn, Kingsway, London, W.C.2. April 4, 1932.

Carb-Nesia. 531,336. Class 3. Chemical substances prepared for use in medicine and pharmacy. Tokalon, Ltd., Chase Road, London, N.W.10. April 26, 1932.

Saledrin. 531,349. Class 3. Chemical substances prepared for use in medicine and pharmacy. May and Baker, Ltd., Garden Wharf, Church Road, Battersea, London, S.W.11. April 26, 1932.

Spibutal. 531,356. Class 3. Chemical substances prepared for use in medicine and pharmacy. E. H. Spicer and Co., Ltd., 72 Wigmore Street, London, W.1. April 26, 1932.

Novax. 530,650. Class 4. Raw, or partly prepared, vegetable animal and mineral substances used in manufactures, not included in other classes. The Walpamur Co., Ltd., Walpamur House, 35-36 Rathbone Place, Oxford Street, London, W.1. April 1, 1932.

Forthcoming Events

June 6.—Royal Institution. General Meeting. 5 p.m. 21 Albemarle Street, London.

June 7.—Mineralogical Society. 5.30 p.m. London.

June 9.—Optical Society. Annual General Meeting. Imperial College of Science and Technology, South Kensington.

June 8.—Television Society. "The Eye: A Link in the Television Chain." W. D. Wright. 7 p.m. University College, Gower Street, London.